Vol. 20. No. 2. pp. 61-126
Abstracts 268-551

February, 1950

THE VETERINARY BULLETIN

1950

5 JUL 1950

COMMONWEALTH BUREAU OF ANIMAL HEALTH
WEYBRIDGE, SURREY
ENGLAND

Price 5/- net

Annual Subscription £2

Commonwealth Agricultural Bureaux.

EXECUTIVE COUNCIL

Sir PATRICK R. LAIRD, C.B., F.R.S.E. (*Chairman*)	United Kingdom.
J. E. CUMMINS, M.Sc., F.R.I.C. (*Vice-Chairman*)	Australia.
Lt.-Col. J. G. ROBERTSON, B.S.A., F.R.S.A.	Canada.
Dr. E. MARSDEN, C.M.G., C.B.E., M.C., F.R.S.	New Zealand.
A. P. van der POST, B.A. (Hons.), B.Sc. (Agric.)	Union of South Africa.
R. McCHLERY, B.A., B.Sc.	Southern Rhodesia.
DEPUTY HIGH COMMISSIONER	India.
THE HIGH COMMISSIONER FOR PAKISTAN	Pakistan.
Sir OLIVER GOONETILLEKE, K.C.M.G., K.B.E. (High Commissioner)	Ceylon.
J. G. HIBBERT, C.M.G., M.C.	Colonies, Protectorates and Mandated Territories.
Sir HERBERT HOWARD, 2, Queen Anne's Gate Buildings, Dartmouth Street, London, S.W.1	*Secretary.*

COMMONWEALTH BUREAU OF ANIMAL HEALTH, WEYBRIDGE

Director, Veterinary Laboratory, Ministry of Agriculture and Fisheries, and Consultant Director of the Bureau:

Professor T. DALLING, M.A., M.R.C.V.S.

Director and Editor of The Veterinary Bulletin and of Index Veterinarius:

W. A. POOL, M.R.C.V.S.

Assistant Director:

M. CRAWFORD, M.R.C.V.S.

Scientific Assistants:

F. A. ABBEY, B.A. (Cantab.), Dip. Forestry; Dip. Timber Tech.
E. GLASNER.
E. MARSH JONES, M.Sc., A.R.I.C.
E. V. LORD.
F. EILEEN WILLIAMS, B.A.

ABSTRACTORS CONTRIBUTING TO THIS ISSUE

UNITED KINGDOM

W. R. Bett, M.R.C.S., L.R.C.P.
Marcus S. Brooke, B.SC.
R. R. A. Coombs, B.SC., PH.D., M.R.C.V.S.
E. Cotchin, M.R.C.V.S.
A. T. Cowie, B.SC., PH.D., M.R.C.V.S.
Ethel M. Cruickshank, PH.D.
Nesta Dean, M.A.
L. G. Donald, M.R.C.V.S.
J. T. Edwards, M.R.C.V.S.
R. J. Fitzpatrick, M.R.C.V.S.
E. J. H. Ford, B.V.SC., M.R.C.V.S.
G. Fulton Roberts, M.A., M.B., B.CH.
J. A. Griffiths, F.R.C.V.S.
G. B. S. Heath, B.SC., M.R.C.V.S.
W. M. Henderson, D.SC., M.R.C.V.S.
Philippa H. Herbert, M.A.
J. R. Hudson, B.SC., M.R.C.V.S.
Isobel W. Jennings, M.R.C.V.S.
S. B. Kendall, B.SC., M.R.C.V.S.
J. O. L. King, B.SC., M.R.C.V.S.
G. V. Laugier, M.R.C.V.S.
P. L. Le Roux, D.SC., M.R.C.V.S.
M. J. Lethbridge, M.SC.
E. F. Lewis, M.R.C.V.S.
R. M. Loosmore, B.V.SC., M.R.C.V.S.
D. Luke, B.SC., M.R.C.V.S.
R. Macgregor, F.R.C.V.S.
L. M. Markson, M.R.C.V.S.
G. P. Marshall.
Rachel Marshall, PH.D.
Anna Mayr-Harting, M.D. (PRAGUE).
W. Moore, D.SC.
J. A. Nicholson, M.A., PH.D., M.R.C.V.S.
J. G. O'Sullivan, M.R.C.V.S.
E. Parker Pollard, B.SC.
W. Plowright, M.R.C.V.S.
D. S. Rabagliati, B.SC., F.R.C.V.S., D.V.S.M.
P. Sasse, DR. MED. (HAMBURG).
K. B. Sinclair, B.V.SC., M.R.C.V.S.
J. I. Taylor, B.SC., PH.D., M.R.C.V.S.
Beryl A. Thurston, B.SC.
G. M. Urquhart, M.R.C.V.S.
E. G. White, B.SC., PH.D., M.R.C.V.S.
C. D. Wilson, M.R.C.V.S.
M. Woodbine, B.SC., F.R.I.C.
A. N. Worden, M.A., B.SC., M.R.C.V.S., F.R.I.C.

AUSTRALIA

H. B. Carter, B.V.SC.
B. A. Forsyth, B.V.SC.
D. A. Gill, M.R.C.V.S., D.V.S.M.
D. Forsyth Stewart, B.V.SC.

CANADA

R. Gwatkin, B.V.SC.
H. Konst, D.V.M.
P. J. G. Plummer, V.S., B.V.SC.

INDIA

S. Sen, M.SC.
M. M. Singh.

COMMONWEALTH BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 20.] February, 1950. [No. 2.

DISEASES CAUSED BY BACTERIA AND FUNGI

GARDNER, J. F. (1949.) **An antibiotic produced by *Staphylococcus aureus*.**—*Brit. J. exp. Path.* **30.** 130–138. **268**

Using Lemco broth and casein hydrolysate medium, G. grew the organism in shallow layers in rectangular porcelain vessels equipped to allow the passage of oxygen over the surface, but not bubbling through the medium itself. The antibiotic was a protein which was precipitated from the cell-free medium by trichloracetic acid, dialysed and dried from the frozen state. Stable to heat in neutral or acid solution, it was quickly destroyed by alkali, organic solvents, pepsin, and trypsin. It slightly inhibited the growth of *Corynebacterium xerosis*, *Staph. aureus*, *C. diphtheriae*, *Bacillus anthracis*, *Mycobacterium phlei*, and *M. lysodeikticus*. It is doubtful if it will have any therapeutic application.—W. R. BETT.

REESER, H. E., & TERPSTRA, J. I. (1947.) De behandeling van staphylococcen-infecties met toxoid. **[Treatment of staphylococcal infections with toxoid.]**—*Tijdschr. Diergeneesk.* **72.** 204–211. [English summary.] **269**

The authors describe in detail the methods by which toxoid is prepared and tested at the National Serum Institute at Rotterdam. They maintain that the antigenic properties of this toxoid are such that it can be recommended for staphylococcal infections in veterinary practice.

—P. L. LE ROUX.

ERNST, J. (1942.) **The epidemiological significance of grouping and typing the haemolytic streptococci.** [Translated by ANDERSEN, H., M.D.] pp. 379. Copenhagen: Ejnar Munksgaard; London: Oxford University Press. 25s. **270**

Most of the first part of this book is devoted to a comprehensive review of the literature on the classification of the haemolytic streptococci. Serological methods are given in detail and a comparison is made between the different Lancefield's groups. The author gives details of 1,635 strains which he grouped and mentions a further eight strains which biochemically resembled group B, but gave no reaction with Lancefield's sera. He designated these strains temporarily as Group N. [This was unfortunate as Shattock and Mattick had already prepared a group serum from *Str. lactis* which they assigned to Group N].

The second half of the book deals with the author's investigations into epidemics of scarlet fever in Denmark. The chapter on milk-borne epidemics is most interesting and the author suggests, from his own experience, that teat lesions and hand stripping may account for the spread of pathogenic streptococci, in this case Group A.

There are many tables throughout the text. An index would have been a useful addition. The translation by Andersen does not do the author justice. There are a few discrepancies, *e.g.* on p. 28 Minett and Stableforth are stated to have found "that *Str. agalactiae* grew on 10% as well as 40% bile-blood agar." In spite of these points, the author is to be congratulated on the amount of work he has put into the subject.—J. I. TAYLOR.

EVANS, A. C. (1946.) **Protection between strains of heterologous agglutinogenic types of beta hemolytic streptococci of Group A. III. Further observations.**—*J. Immunol.* **52.** 1–15. [For previous parts, see *V. B.* **12.** 522, & **14.** 47.] **271**

In cross-protection tests between strains of Group A streptococci of heterologous agglutinative types, a direct relationship was established between certain of the types.—A. MAYR-HARTING.

GALLAHER, M. A. (1948.) **The modified Whiteside test in the diagnosis of mastitis.**—*Irish. Vet. J.* **2.** 210–216. **272**

G. used a modified Whiteside test on 488 macroscopically normal milk samples.

Whiteside-negative samples were usually negative on cultural examination, but a large proportion of Whiteside-positive samples were also bacteriologically negative. The reasons for this high percentage (54%) of false positive tests are discussed, it being suggested that the stage of

lactation at which the milk sample was taken from the cow may be an important factor. Samples drawn early or late in the lactation usually yield a positive reaction and when such samples are excluded the number of false positive samples is still high (38%).

G. concludes that while a negative Whiteside test is indicative of freedom from infection, a positive test must be considered in the light of the stage of lactation of the cow and any difference in degree of reaction from one quarter to another of the same cow.—C. D. WILSON.

JOHNSON, F. H., & ZOBELL, C. E. (1949.) **The acceleration of spore disinfection by urethan and its retardation by hydrostatic pressure.**—*J. Bact.* **57.** 359–362. [Authors' summary copied *verbatim.*] **273**

At 25 C, concentrations of urethan up to 2 M have no effect on the viability of *Bacillus subtilis* spores in phosphate-buffered NaCl solution, over short periods of observation. Disinfection of these spores at 93·6 C, however, is appreciably accelerated by 0·1 M urethan, and greatly accelerated by concentrations of 0·5 to 2·0 M. The rate of disinfection with as well as without urethan is retarded by hydrostatic pressure, the amount of the retardation increasing with pressure from 100 to 600 atmospheres.

TERENTIEV, F. A., & STEFANOVA, E. I. (1946.) **[The essence of immunity in anthrax. The significance of post-vaccine reaction as the causative agent of immunity. Killed culture vaccine.]**—*Veterinariya, Moscow.* **23.** No. 10–11. pp. 6–11. **274**

The authors consider that successful anthrax vaccination depends upon the concurrent excitation of the nervous system by either physical stimulation or by the use of a sufficient amount of antigen to cause a local reaction, stating that the tissue cells, body fluids and leucocytes are, apparently, unable to perform their functions without the aid of this intermediary. They found that a smear of First or Second Pasteur anti-anthrax vaccine on the freshly shaved skin of g. pigs, while it was still irritated, completely immunized; the same vaccine, however, failed to immunize when similarly applied to freshly shaved skin if it contained an excess of saponin, which caused local necrosis affecting the tissues including the nerve endings, which were therefore unable to react.

The authors tested the value of formolized culture of killed anthrax bacilli. Four rabbits and 25 mice were injected subcutaneously with 0·1 mg. 3% and 0·5% solution respectively of saponin. Five hours later they were injected intravenously with killed culture. Five and six days later all were given a lethal test dose of anthrax bacilli. Three of the rabbits and 14 of the mice survived, but the 13 controls [species not stated] died. In another similar experiment in which agar was substituted for saponin, two of four vaccinated rabbits and all of the 18 mice died.—F. A. A.

VAN SACEGHEM, R. (1946.) La tuberculose bovine au Ruanda-Urundi. **[Bovine tuberculosis in the Belgian Congo.]**—*Bull. Off. internat. Epiz.* **25.** 140–142. **275**

Although human TB. has become more and more common in Ruanda-Urundi, bovine TB. is very rare, only two cases having been seen in indigenous cattle. They possess natural resistance to both natural and experimental infection. The author refers to the publications of Carmichael on TB. in cattle in Africa and warns against the dangers of importing European cattle; he considers that zebu cattle stock should be used.

—MALCOLM WOODBINE.

ALLANSSON, K. (1946.) Aviär uterustuberkulos hos ko, medfödd tuberkulos hos kalven. **[Avian type tuberculosis of the uterus in a cow and congenital tuberculosis in its calf.]**—*Skand. VetTidskr.* **36.** 742–746. [Abst. from English summary.] **276**

Congenital TB. of a calf from a farm where there were tuberculous poultry was established P.M.

The uterus of the dam examined later was found to be infected with avian type tubercle bacilli. There was about a coffee-cupful of thick, blood-stained, granular secretion in each uterine horn. The mucosa was dull and somewhat granular and possibly the seat of commencing necrosis. Smears from the secretion and from the mucosa contained a number of tubercle bacilli, which by type determination proved to be avian.

The author considers that the infection was transmitted by farm personnel handling tuberculous fowls.—E. G.

MEYN, A. (1949.) Die tuberkulöse Bakteriämie des Rindes. **[Tuberculous bacteraemia of cattle.]**—*Tierärztl. Umsch.* **4.** 8–10. **277**

M. states that he was unable to demonstrate tubercle bacilli in the blood of several hundred slaughtered tuberculous cattle, including animals affected with the miliary type, although in 50–80% of them tubercle bacilli were demonstrated in the tissues by either cultural examination or g. pig inoculation.—M. S. BROOKE.

FLÜCKIGER, G. (1949.) Zur Tilgung der Rindertuberkulose. **[Control of bovine TB.]**—*Wien. tierärztl. Mschr.* **36.** 71–79 & 130–138. **278**

The methods of control used in Denmark, Germany, Switzerland, and the U.S.A. are briefly reviewed. Bovine TB., equally dangerous for man and cow, should be energetically fought on

humanitarian, social and economic grounds. Control of the disease is not so much a scientific as an economic problem.—W. R. Bett.

Patnode, R. A., Cummings, M. M., & Spendlove, G. A. (1949.) **The adaptability of mice to the laboratory diagnosis of tuberculosis.**—*J. Lab. clin. Med.* **34.** 1081–1095. [Authors' summary copied *verbatim.*] **279**

The susceptibility of pigmented strains of mice (dba and C57) to tuberculosis induced by the intracerebral and intravenous inoculation of virulent human tubercle bacilli has been confirmed. In these studies, tubercle bacilli of the human, bovine, and avian types were of similar virulence for mice following inoculation by the intracerebral route. An acid-fast saprophyte failed to produce a progressive disease.

In a comparative study involving a series of twenty-five strains of acid-fast bacilli there appeared to be a high degree of correlation between virulence for mice and virulence as measured by classical guinea pig tests. Preliminary studies indicated that a combination of rapid, diffuse growth in a liquid medium of the Dubos type plus subsequent mouse inoculation would reduce considerably the time required for the laboratory diagnosis of tuberculosis. Penicillin, added to a Tween-albumin medium in a concentration of 2 units per milliliter with the purpose of suppressing the growth of contaminants, proved to be toxic to the tubercle bacilli contained in experimental inocula consisting of digested and neutralized sputum specimens.

Both treated (NaOH) and untreated routine clinical specimens were shown to be extremely toxic when inoculated (intracerebrally) directly into mice in an attempt to recover tubercle bacilli; therefore the routine use of mice as a primary diagnostic procedure is not practical by the methods described. The theoretical and practical aspects of mouse infection tests are discussed in some detail.

Verge, J., & Turbé-Bion, M. (1948.) Le diagnostic de la tuberculose aviaire par la myéloculture. **[Diagnosis of avian TB. by marrow culture.]**—*C. R. Soc. Biol., Paris.* **142.** 1208–1209. **280**

Avian type *Mycobact. tuberculosis* was isolated from bone marrow grown on Löwenstein medium after ten days' incubation, from 42 out of 71 infected fowls. Rough colonies appeared in some cultures. It is not known if these were natural variants or whether they were rough as a result of cultivation on an artificial medium.—L. G. D.

Wessels, C. C. (1948.) **A review of the literature on the so-called skin-lesion reactors to the tuberculin test.**—*J. S. Afr. vet. med. Ass.* **19.** 3–19. **281**

A comprehensive review of the literature. It is divided into two main sections, namely, a general discussion of the subject and an account of the characters of the lesion.—L. M. M.

Levaditi, C., & Vaisman, A. (1949.) Etude expérimentale de la vaccination antituberculeuse par le B.C.G. **[Experimental study of BCG vaccination.]**—*C. R. Soc. Biol., Paris.* **143.** 312–314. **282**

Four groups of white mice were used [numbers not stated]. One group received intraperitoneally 1 ml. of BCG vaccine diluted 1 : 20. A second group received in addition 500 units of streptomycin daily, totalling 30,000 units. The third group received the streptomycin course, but no vaccine; the last group served as controls. All the animals were given 1 mg. of virulent tubercle bacilli intravenously and were examined P.M. 17–75 days later, both for macroscopic and microscopic lesions and for acid-fast bacilli.

It was found that the vaccination exerted a strong protective effect, and that the addition of the streptomycin course noticeably improved the protection.—G. Fulton Roberts.

Raffel, S., Arnaud, L. E., Dukes, C. D., & Huang, J. S. (1949.) **The rôle of the "wax" of the tubercle bacillus in establishing delayed hypersensitivity. II. Hypersensitivity to a protein antigen, egg albumin.**—*J. exp. Med.* **90.** 53–72. [Authors' summary copied *verbatim.*] **283**

Guinea pigs sensitized with egg albumin along with the purified wax fraction of the human tubercle bacillus respond with delayed hypersensitive reactivity to the protein antigen. Previous publications have reported a similar activity of the wax with respect to tuberculoprotein and picryl chloride. The effect is not referable to an ordinary adjuvant activity of the bacillary wax, since antibody titers are not increased in animals which receive it, and since a known adjuvant, water-in-oil emulsion, has no effect with respect to the induction of delayed hypersensitivity.

This report further extends the rôle of the tubercle bacillary wax in the induction of delayed hypersensitive states.

Koerner, T. A., Getz, H. R., & Long, E. R. (1949.) **Experimental studies on nutrition in tuberculosis. The role of protein in resistance to tuberculosis.**—*Proc. Soc. exp. Biol., N.Y.* **71.** 154–158. **284**

To substantiate the widely held belief that a high level of dietary protein is protective against TB., three groups of rats which had lived for a number of generations on diets containing 15%,

25% and 40% protein respectively were injected intravenously with virulent bovine tubercle bacilli. Extensive TB. occurred after the 150th day in all groups, but it was noticeable that in the 40% protein group the degree of localization was better, the number of bacilli in the lesions smaller and there was less dissemination of tuberculous lesions.—J. A. NICHOLSON.

SWEDBERG, B., & WIDSTRÖM, G. (1948.) Om samband mellan tuberkelbacillstammarnas resistens *in vitro* och kemoterapieffekt *in vivo*. **[The relation between the *in vitro* resistance of strains of tubercle bacilli and the effect of chemotherapy *in vivo*.]**—*Nord. Med.* **40.** 2227–2228. [Abst. in *Bull. Hyg., Lond.* **24.** 279. (1949), copied *verbatim*. Signed: D. J. BAUER.] **285**

Groups of mice and guinea pigs were infected with standard doses of tubercle bacilli and treated with *p*-aminosalicylic acid or streptomycin. Dosage corresponded to the usual clinical levels. The survival time was compared with that of untreated control animals which had been inoculated with the same dose of tubercle bacilli. Two strains of tubercle bacilli were used, which were respectively sensitive and insensitive to *p*-aminosalicylic acid *in vitro* tests; both strains were equally sensitive to streptomycin. No definite chemotherapeutic effect could be demonstrated with *p*-aminosalicylic acid in mice infected with either strain, although streptomycin was effective in prolonging the survival time. The effect of streptomycin was not increased by giving *p*-aminosalicylic acid at the same time. Streptomycin was effective and *p*-aminosalicylic acid ineffective in controlling infection in guinea pigs inoculated with the resistant strain. Similar results were obtained with the non-resistant strains; here streptomycin was very effective even in amounts corresponding to a quarter of the usual clinical dose. An increased effect was seen when this level of streptomycin dosage was combined with treatment with *p*-aminosalicylic acid. No development of *in vitro* resistance to *p*-aminosalicylic acid could be found in organisms isolated from animals treated for long periods with the compound. The ineffectiveness of *p*-aminosalicylic acid in these experiments, even with non-resistant types, is attributed to insufficiently frequent administration (twice daily), which did not enable a satisfactory response to chemotherapy to be obtained.

BROWNLEE, G., GREEN, A. F., & WOODBINE, M. (1948.) **Sulphetrone: a chemotherapeutic agent for tuberculosis: pharmacology and chemotherapy.**—*Brit. J. Pharmacol.* **3.** 15–28. **286**

Sulphetrone (4,4′-bis (γ-phenyl-n-propylamino)-diphenylsulphone tetrasodium sulphonate) is crystalline, soluble in water, and insoluble in alcohol. 20% and 40% solutions (W/V) are stable when neutral or slightly alkaline and may be autoclaved. Conditions for absorptiometric estimation are given.

It is less toxic to mice and dogs than any other sulphone or sulphonamide. Adult rabbits (2·5–3 kg.) given a diet containing 4% sulphetrone for 40 days developed slight but continuous haemolytic anaemia and progressive iron-deficiency anaemia resulting from formation of an insoluble iron salt. Nutritional anaemia also occurred probably because of interference with the intestinal bacteria. The goitrogenic effect characteristic of sulphonamides was slight.

The low toxicity indicates that sulphetrone is not degraded to diaminodiphenyl sulphone in the body. Alkali reserve measurements indicate that self-condensation takes place.

Although soluble, the drug is absorbed slowly, chiefly from the intestine. It is rapidly excreted by the kidney. In the rabbit renal clearance is slower and the maximum effective dose therefore higher than in the dog and mouse.

Sulphetrone rapidly enters all tissues except the brain. It passes into the cerebrospinal fluid more slowly than other sulphonamides. It has no action on smooth muscle, heart, blood pressure or respiration. *In vitro* and in the presence of blood sulphetrone approaches the efficiency of diaminodiphenylsulphone against avian type tubercle bacilli and five strains of human and bovine type tubercle bacilli. It is more effective than sulphanilamide against β-haemolytic streptococcal infection in mice. It is ineffective against pneumococcal infection.—NESTA DEAN.

I. BROWNLEE, G., & KENNEDY, C. R. (1948.) **The treatment of experimental tuberculosis with sulphetrone.**—*Brit. J. Pharmacol.* **3.** 29–36. **287**

II. BROWNLEE, G., & KENNEDY, C. R. (1948.) **The chemotherapeutic action of streptomycin, sulphetrone, and promin in experimental tuberculosis.**—*Ibid.* 37–43. **288**

I. Two groups of 20 g. pigs were heavily infected with the virulent bovine strain of tubercle bacilli CN. 858. The average survival time was 45 days in the untreated group and 77 days in those given 2 g. sulphetrone in the diet. These animals ingested about 0·6 g. daily and had blood concentrations of 5 mg. per 100 ml. Similar results were seen with the human virulent H.37 strain (CN. 271).

Miliary TB. developed when drug treatment was stopped. Healed tubercles were seen in treated animals which died. Sulphetrone does not eliminate the infection.

II. Four groups of 18 g. pigs were infected with 0·25 mg. of a human virulent strain, CN. 844 of *Mycobact. tuberculosis*. After 22 days, drugs were administered to the groups for 168 days as follows: (a) 0·5% promin in the diet; (b) 2% sulphetrone in the diet; (c) 10 mg. streptomycin parenterally daily; (d), both (b) and (c).

The course of the disease was estimated by reaction to the intradermal tuberculin test, the severity of which was related to weight records, lymph node enlargement, and histological evidence. The disease progressed in all groups, being greatest in 11 untreated controls, and decreasing in severity in cases treated as from (a) to (d). A synergistic action of streptomycin with sulphetrone occurred, and this combination was judged worthy of clinical trial. No drug-resistance occurred.—NESTA DEAN.

YOUMANS, G. P., & YOUMANS, S. (1949.) **A method for the determination of the rate of growth of tubercle bacilli by the use of small inocula.**—*J. Bact.* **58.** 247–255. [Authors' summary copied *verbatim*.] **289**

Decimal dilutions of virulent human type tubercle bacilli were prepared which varied from 10^{-1} to 10^{-8} mg moist weight. Tubes of three types of liquid media were inoculated with each concentration of tubercle bacilli. These were incubated at 37 C and examined daily to determine the time at which visible subsurface growth of each inoculum first appeared. The determination of this point represented a measurement of approximately the same number of organisms in each set of tubes.

By plotting the logarithms of the inocula employed against the time at which visible growth of each inoculum first appeared, a linear relationship was found. From the slope of the straight line so obtained, the growth rate and the generation time could be calculated. This method can be used to determine with greater accuracy the effect of various substances or physical conditions on the rate of growth of tubercle bacilli.

HUTSON, L. R. (1949.) **Initial observations on the incidence of Johne's disease in Barbados, B.W.I.**—*Canad. J. comp. Med.* **13.** 122–124. **290**

A case of Johne's disease diagnosed in the island of Barbados establishes the occurrence of the disease on this island with certainty for the first time. The following summary is made regarding the present distribution of the disease in the British Caribbean area: several confirmed cases in the islands of Jamaica and Trinidad, no diagnosed cases in the Leeward Islands or in British Guiana.—H. KONST.

NORDBERG, B. K. (1947.) Bidrag till kännedomen om Corynebacterium pyogenes biologi. **[The biology of *Corynebacterium pyogenes*.]**—*Skand. VetTidskr.* **37.** 518–529. [English summary.] **291**

C. pyogenes produces an exotoxin which can be demonstrated in rabbits. The time required for culturing the organism can be reduced by adding cystine to blood agar substrates of pH 7·8–8·2. Substrates containing potassium tellurite (K_2 Te O_3) were of value in culturing the organism from contaminated exudates.

N. emphasized the importance of *C. pyogenes* exotoxin in immunization.—E. G.

NOTTBOHM, H. (1947.) Unspezifische Reaktionen bei der serologischen Festellung des Maleus. **[Non-specific reactions in serological diagnosis of glanders.]**—*Dtsch. tierärztl. Wschr.* **54.** 173–175. **292**

Of blood samples taken over a period of several years from 138,003 horses in which there were no clinical signs of glanders and which were negative reactors to the mallein conjunctival test, 0·07% yielded positive reactions to the complement fixation test. In the course of complement-fixation tests at fortnightly intervals on serum from some of these horses the reactions became weaker and in most cases became negative. N. regarded most of these positive complement-fixation reactions as non-specific.—M. S. BROOKE.

HOWE, C., & MILLER, W. R. (1947.) **Human glanders: report of six cases.**—*Ann. intern. Med.* **26.** 93–115. **293**

Six cases of glanders that developed in laboratory personnel engaged in *Pfeifferella mallei* research are described. The organism was not recovered from any of the patients. Normal human sera agglutinated *Pf. mallei* in dilutions up to 1 : 320, but did not fix complement. Sera from 35 cases of primary atypical pneumonia gave low agglutination titres and were negative to the complement-fixation test. In the diagnosis of the six cases, titres higher than 1 : 320 were therefore regarded as positive. Complement fixation was less sensitive, but more specific.

A skin test, using 0·1 ml. of mallein injected intradermally, was also used. In positive cases the resulting erythema was 10–20 mm. in diameter. One patient, given for experimental purposes 0·2 ml. of mallein intradermally six months after his recovery, reacted positively.

On a basis of results obtained with hamsters, the patients were subjected to a 20-day treatment with sulphadiazine and all recovered. The case histories are given in considerable detail.—E. G.

CHUTE, H. L. (1949.) **An outbreak of *Pseudomonas* infection in poults.**—*Canad. J. comp. Med.* **13.** 112–115. **294**

An outbreak of *Pseudomonas pyocyanea* infection occurred in 87 White Holland poults. A few died daily and the mortality in the first three weeks was 68. The principal symptoms were staggering gait, drooping wings, and a foamy diarrhoea. P.M. examination revealed fluid in the abdominal cavity, gelatinous exudate under the skin, paleness of the liver, and intestinal inflammation with some petechial haemorrhages. The peak period of mortality was over before the diagnosis was made so that no treatment was attempted.—R. GWATKIN.

MUNOZ, J., SCHERAGO, M., & WEAVER, R. H. (1949.) **A serological study of members of the *Pseudomonas* genus.**—*J. Bact.* **57.** 269–278. [Authors' summary and conclusions slightly amended.] **295**

A study has been made of a representative group of strains of *Pseudomonas* to determine whether there is any serological relationship among strains of this genus. A group of monotrichous strains with the morphological and biochemical characters of *P. aeruginosa* [*pyocyanea*] could be differentiated into two distinct serological groups, one of which was homogeneous and the other heterogeneous. A lophotrichous strain that had the same biochemical characteristics had a strong flagellar relationship to the heterogeneous group. *P. caviae*, *P. fragi*, *P. graveolens*, *P. mucidolens*, and *P. pavonacea*, species that are readily differentiated by their biochemical characteristics, could also be differentiated serologically. *P. fluorescens*, *P. mildenbergii*, *P. ovalis*, and *P. putida*, species that could not be satisfactorily differentiated by means of their biochemical characters, could be very easily differentiated by serological means.

It may be concluded that serological reactions, in addition to morphological and biochemical characters, are essential for the identification and classification of various members of the *Pseudomonas* genus.

DIENES, L. (1949.) **The development of *Proteus* cultures in the presence of penicillin.**—*J. Bact.* **57.** 529–546. [Author's summary slightly amended.] **296**

Tiny pleuropneumonia-like colonies that the author had previously described in *Proteus* cultures were grown with the help of penicillin to larger size and could be maintained indefinitely in subculture. The appropriate composition of the medium is of great importance for the growth of these colonies.

Multiplication of most freshly isolated *Proteus* strains is inhibited in the usual bacillary forms by the addition of 10 to 50 units of penicillin per ml of the medium. However, on soft horse serum agar plates in the course of a few days colonies develop in media containing up to 10,000 units of penicillin per ml. They grow in two distinct types. One type remains small on the original plate (0·05 to 0·2 mm) and grows easily in transplants whether or not penicillin is present. If penicillin is absent, the usual bacillary form of *Proteus* reappears within one or a few days or up to several weeks, according to the time that has elapsed since the isolation of the culture. The colonies of the second type are larger (1 to 3 mm). Transferred to penicillin-free media, they reproduce the usual bacillary forms within a few hours. On media containing penicillin they produce an abundant growth of the small colonies with an occasional large colony. Both the small and the large type of colonies are similar in morphology and physical properties to the L_1 developing in *Streptobacillus moniliformis*. The bacilli recovered from these colonies have no increased resistance to penicillin and are not changed in their genetic properties. The large colonies are evidently a growth form of *Proteus* because they are derived from the bacilli and return easily to this form. That the small colonies are also a growth form of the bacillus is evidenced by their reversion to the usual bacillary form and by their similarity to the bacilli in serological properties and metabolism.

Proteus, like *Streptobacillus moniliformis* and *Bacteroides*, survives and multiplies in the L form under appropriate conditions on agar plates containing high concentrations of penicillin. When L colonies develop spontaneously, their role apparently is similar. The cultures undergo autolysis, the bacillary forms are destroyed, and growth continues in the L form. Transformation into this form is apparently a response to certain types of adverse conditions and is not a specific effect of penicillin.

The effects of various types of bacteriostatic chemicals were studied. One of them, carboxymethoxylamine, had an effect similar to that of penicillin and induced growth of L colonies. The effect was quantitatively much less than that of penicillin.

SCHWABACHER, H. (1949.) **A serological investigation of the paracolon group of organisms.**—*J. Path. Bact.* **61.** 63–74. [Author's summary copied *verbatim*.] **297**

Ninety paracolon bacilli were divided into 16 biochemical groups by their power to ferment sucrose, dulcitol, salicin and lactose. Immune serum was prepared from 9 strains representing the predominant biochemical group and the antigenic relationships of these strains were determined by mirror-absorption tests.

Of 90 late-lactose fermenters from faecal and urinary sources, 75 (83·3 per cent.) shared either a somatic or a flagellar antigen, or both, with one

or more of the type strains. It was possible to characterise 59 (65·5 per cent.) strains in terms of a somatic antigen. The somatic antigen of 18·6 per cent. of these 59 strains was shared by more than one of the type strains. Forty-seven (52·2 per cent.) had H antigens related to those of the type strains. There was multiple cross agglutination in 76·6 per cent. of these 47 strains, showing the lesser specificity of flagellar antigens. There was no constant association between biochemical and serological groups, nor was there an antigen common to all or even the majority of the paracolon strains. Three strains of motile paracolon bacilli tested for phase variation were apparently monophasic. Fifteen strains of non-lactose fermenters were tested against the serum of the patients from whom the organisms had been obtained. Two agglutinating systems yielded a significant titre. Two strains of paracolon bacilli, 1136 and 8179, were found to possess a common heat-labile antigen similar to the non-virulent Vi antigen of Salmonella described by Kauffmann (1936). The proportional amount of the Vi antigen appears to vary with the strain. It was present in greater quantity on 1136 than on 8179. One rabbit antiserum appeared to contain non-agglutinating antibodies to a strain containing an agglutinable heat-labile antigen.

Davis, B. D. (1949.) **The isolation of biochemically deficient mutants of bacteria by means of penicillin.**—*Proc. nat. Acad. Sci., Wash.* **35.** 1–10. [Abst. in *Bull. Hyg., Lond.* **24.** 434. (1949), copied *verbatim.* Signed: Mary Barber.] **298**

The observation that penicillin only sterilizes multiplying bacteria suggested to the author that mutants with increased nutritional requirements might be isolated with the aid of this antibiotic. A search was therefore made for biochemical mutants among the survivors of extensive but incomplete sterilization by penicillin. After exposure to ultraviolet irradiation in a minimal medium, the bacteria were permitted to grow in an enriched medium for 24 hours at 37°C., separated by centrifuging and washed. The washed cells resuspended in water were added in various dilutions to minimal medium containing 300 units penicillin per ml. After incubation at 37°C. for 24 and 48 hours, these mixtures were plated out on minimal and enriched media. By this means a variety of mutants of *Bact. coli* requiring various amino-acids, nucleic acid components and vitamins were obtained. The mutants were not more resistant to penicillin in the presence of their added growth requirements than the parent strain of *Bact. coli.* Mutants induced by ultraviolet irradiation did not survive exposure to penicillin in minimal medium unless first permitted a period of growth in an enriched medium. The author suggested that this subculture was necessary for the new genotype to acquire expression as a deficient phenotype.

Sindbjerg-Hansen, V. (1942.) Anwendung von Mucin-Infektionen bei chemotherapeutischen Untersuchungen. (Versuche mit Meningokokken, B. coli, B. typhi und B. paradysenteriae.) [**Use of mucin-induced infections in chemotherapeutic experiments. Tests with meningococci,** *Bact. coli, Salmonella typhi* **and** *Bact. flexneri.*]—*Acta path. microbiol. scand.* **19.** 165–172. [In German.] **299**

White mice were infected with a meningococcus strain, *Bact. coli, Salmonella typhi* and *Bact. flexneri,* mucin from pig stomach being mixed with the inoculum to enhance the pathogenicity. Without this treatment it is difficult to set up suitable illness in such animals with any degree of certainty; to produce illness the amount of the infective agent alone would often be so large that toxic effects would result from the large amount of bacterial endotoxin administered. A system of dosage was worked out.

Trials of the value of therapeutic agents were carried out with infected mice. Sulphapyridine was protective against the meningococcus, *Bact. coli, Bact. flexneri* and *S. typhi.* Sulphathiazole was protective against the meningococcus, *Bact. coli* and *S. typhi.* Sulphamethylthiazole was protective against the meningococcus, *Bact. flexneri* and *S. typhi.*—P. Sasse.

Crossley, V. M., McKay, A., McIntosh, R. A., & Smith, L. T. (1949.) **The occurrence of** *Salmonella typhi-suis* **on the North American continent.**—*Canad. J. comp. Med.* **13.** 205–209. **300**

The first strain of *S. typhi-suis* reported on the North or South American continents was isolated at the Ontario Veterinary College from a pig which was killed for P.M. examination. The lungs contained areas of consolidation with caseation necrosis, congestion and oedema. Mediastinal, bronchial and mesenteric lymph nodes were enlarged and had caseous foci. The culture was identified by the National Salmonella Typing Centre in Toronto as *S. typhi-suis* VI, VII; C-1, 5. The culture tended to stabilize in phase 2 and was considered as belonging to the Voldagsen variety.—R. Gwatkin.

Felsenfeld, O., González, L. M., & Young, V. M. (1948.) **Studies on salmonellosis in Puerto Rico. I. Salmonella types isolated from man and animals in Puerto Rico.**—*Puerto Rico J. publ. Hlth.* **24.** 9–15. [Abst. in *Bull. Hyg., Lond.* **24.** 439. (1949), copied *verbatim.* Signed: J. C. Cruickshank.] **301**

This is a report from Porto Rico of a survey of material from various sources for the presence of salmonellae during a period of six months. Of 237 persons suffering from diarrhoea 5·49 per cent were excreting salmonellae, the most frequent being *Salm. typhi-murium.* Six of 500 persons without symptoms yielded salmonellae. Organisms of this group were isolated from 7 out of 15 rats, from 12 of 30 freshly slaughtered pigs and from 20 per cent. of retail pork samples. The organisms were found in one of 50 samples of beef from a market, in 3 of 10 samples of hamburger (a mixture of beef, pork and other meats), and from the liver, muscle or glands of 7 of 50 apparently healthy chickens. The commonest organisms from animal sources were *Salm. typhi-murium*, *Salm. newport* and *Salm. cholerae-suis. Salm. paratyphi B* was isolated from pigs on two occasions.

The relatively low incidence of salmonella infections in the population of Porto Rico, in spite of the frequency of the organisms in the various foodstuffs, is probably due to the local food habits which include particularly thorough cooking.

BELL, A. E. (1949.) **Physiological factors associated with genetic resistance to fowl typhoid.**—*J. Infect. Dis.* **85.** 154–169. [Author's summary and conclusions slightly amended.] **302**

The relationships of body temperature and phagocytic activity of polymorphonuclear leucocytes to genetic resistance were studied in strains of chicks differentiated in their resistance to *Salmonella gallinarum*, the causative organism of fowl typhoid. Resistant strains of chicks had abnormally high body temperatures during the test period, 9 to 23 days of age. Following inoculation at 10 days of age this higher temperature was maintained for a period of 3 to 4 days, the normal incubation period for fowl typhoid. Fever temperatures of 1° to 2°C above normal developed in susceptible individuals during the later stages of the disease. Within both resistant and susceptible strains a fever at this time was associated with susceptibility.

Artificially reduced body temperatures lowered resistance in all strains below that of corresponding controls. Resistant chicks were more nearly able to maintain normal body temperature under adverse conditions indicating a more efficient temperature-regulating mechanism.

Phagocytosis studies *in vitro* revealed no differences in the phagocytic abilities of polymorphonuclear leucocytes from resistant and susceptible strains. Both strains showed greater phagocytosis with increasing temperature. This suggests that phagocytosis *in vivo* would occur at a faster rate in resistant chicks due to their higher body temperature.

Little intracellular digestion of phagocytosed bacteria occurred in polymorphonuclear leucocytes from the susceptible strain, while marked lysis of bacteria was evidenced by resistant cells. This qualitative difference in intracellular enzymes could account for specific disease resistance without imparting a generalized resistance.

Bactericidal properties of whole blood or serum are not a factor in fowl typhoid resistance.

The ability of polymorphonuclear leucocytes to digest phagocytosed bacteria appears to be a major factor in genetic resistance to *S. gallinarum.* Differences in body temperature assume an important supporting role.

ANDERSON, G. W., JONES, J. C., COOPER, J. B., & MORGAN, C. L. (1947.) **Sodium sulfamerazine in the treatment of pullorum disease.**—*J. Amer. vet. med. Ass.* **111.** 141–143. **303**

Data were presented which indicated that 0·2% sodium sulphamerazine in the drinking water controlled artificially induced pullorum disease. No toxic effects were seen during the 21 days for which the drug was administered. Tested at nine weeks the treated group had a high percentage of reactors. The chicks were protected against the disease, but the formation of circulating antibodies was apparently not prevented.—D. L.

JORDAN, C. F. (1948.) **Brucellosis in industry.**—*Industr. Med.* **17.** 176–180. [Abst. in *Bull. Hyg., Lond.* **23.** 682. (1948), copied *verbatim.*] **304**

The average annual incidence of reported *Brucella* infections in the United States (excluding the District of Columbia) rose from 1·99 per 100,000 in the years 1930–39 to 3·11 in 1940–46. The incidence in different states varies widely, from 0·3 in 1940–46 for North Carolina, "the only state thus far accredited in the program for eradication of brucellosis in dairy cows," to rates exceeding 4·8 in ten states, mainly in the Middle West. The highest rates were recorded in Vermont (18·5) and Iowa (15·6).

Data relating to the series of 2,405 cases reported in Iowa in the period 1940–46 are analysed. In a quarter of these cases there was no history of contact with farm animals; the incidence was equal in the sexes and it is assumed that infection arose from unpasteurized milk. In the other cases there was a history of contact with animals, mainly hogs and cows; 87·7 per cent. of the victims were males and 75 per cent. were in the 20–49 age group. Nearly 95 per cent. of the group associated with animals were either male farm workers or employees in the meat packing industry. When incidence of *Brucella*

infection was related to numbers at risk it was found that the morbidity rate was highest in veterinarians, and that it was five times higher in packing-house workers than in male farm workers and nearly 70 times greater than in the urban population who were without contact with livestock. Comparison of the figures for male farm workers and other farm residents suggests that friction with struggling animals plays a part in the mechanism of infection.

Data from the abattoirs show that about 3 per cent. of swine have a significant titre of *Brucella* antibodies and that a high proportion of these (41 per cent. in one series) harbour the organism. The risk to the workers is greatest in the departments where killing and splitting of carcases take place.

Of 434 strains isolated from human cases in Iowa, 30 per cent. were *Br. abortus*, 58 per cent. *Br. suis* and 11 per cent. *Br. melitensis*. The best methods of diagnosis were blood culture and agglutination tests. The limitations of the skin test are indicated by the observation that 10–25 per cent. of the normal population give a positive reaction.

Apart from the use of any effective vaccine which may be developed, and the elimination of *Brucella* infection from livestock, the control measures should include early diagnosis, the use of rubber gloves at abattoirs and packing stations, where practicable, the treatment of minor injuries and the frequent disinfection of banisters and other surfaces from which the office workers may acquire the disease.

GRIFFITTS, J. J. (1947.) **Agglutination and an agglutinin-" blocking " property in serums from known cases of brucellosis.**—*Publ. Hlth Rep., Wash.* **62.** 865–875. **305**

This paper records experimental work directly applying to *Brucella* infection diagnosis and to the modified agglutination techniques developed by workers for the demonstration of the various types of rhesus antibodies. Antibodies to the *Brucella* organism which were not demonstrable using the normal agglutination technique in a saline medium, were shown to be present in certain sera.

By applying the " blocking test " of Race and Wiener " blocking " antibodies could be demonstrated. Serum freshly drawn from individuals with histories of brucellosis prevented or weakened the action of a known anti-brucella agglutinin. However, serum freshly drawn from individuals without histories of brucellosis also prevented the action of subsequently added agglutinin, although to a lesser degree. By previous heat treatment of the serum (56°C. for 15 min.) this blocking action of serum from normal individuals was removed while serum from cases of brucellosis still retained its inhibiting action.

In a similar manner, by applying the Diamond albumin test or Wiener's so-called " conglutination test " in which normal rabbit serum (previously treated with human serum to remove a precipitate) was used as the suspending medium in the place of saline, the " non-agglutinating ", " blocking " or " incomplete " antibodies could be made to agglutinate.

Another procedure based on the principles of Diamond's rapid open slide test for rhesus antibodies, in which a heavy bacterial suspension suspended in normal rabbit serum and undiluted suspect human serum were mixed together on a warm glass slide, suggested itself as a reliable screening test.

The anti-globulin sensitization test as applied by Morgan and Schutze for the detection of non-agglutinating bacterial antibodies had not come to the notice of the author when this present work was undertaken.—R. R. A. COOMBS.

PUGH, L. H. (1948.) **Effect of gonadal hormones on experimental infection of rats with** *Brucella abortus*.—*Proc. Soc. exp. Biol., N.Y.* **68.** 591–592. **306**

In rats receiving 1–5 mg. of testosterone propionate subcutaneously there was increased resistance to experimental *Br. abortus* infection. Females were more resistant than males.—J. I. T.

PINCHOT, G. B., CLOSE, V. P., & LONG, C. N. H. (1949.) **Adrenal changes produced in rats by infection with** *B. tularense* **and** *B. coli*.—*Endocrinology.* **45.** 135–142. [Authors' summary slightly modified.] **307**

Rats infected with *Br. tularensis* showed an increase in adrenal size and a profound fall in adrenal cholesterol content. The change in adrenal ascorbic acid content was highly variable, indicating the unsuitability of this determination as an indication of the functional state of the adrenal cortex in prolonged infections. Infected rats showed a significant rise in RQ as compared with normals.

Dosages of adrenal cortical hormone preparations many times larger than those required for maintenance of adrenalectomized animals failed to prevent the adrenal cholesterol depletion or significantly prolong the survival time of infected animals, although the treated animals were better able to maintain body temperature and seemed more active than the controls.

Rats receiving large doses of living *B. coli* intravenously had an adrenal cortical response similar to that produced by a single injection of pituitary adrenotrophic hormone as measured by adrenal size ascorbic acid and cholesterol content. The ascorbic acid levels correlated with the other measurements of adrenal cortical function in this short-term experiment.

The differences in the effects of the two organisms on the adrenals are believed to be primarily differences in the duration of the adrenal stimulation they produced.

SHANKS, P. L. (1949.) **Enterotoxaemia in goats.** —*Vet. Rec.* **61.** 262–263. Discussion: pp. 263–264. **308**

This condition is caused by *Clostridium welchii* type D. Goats under two years old are most susceptible. The severity of an attack varies greatly. Three cases treated with serum (50 ml. twice daily) together with sulphamethazine (3–4 g.) recovered within 48 hours. Preventive use of pulpy kidney vaccine (*Cl. welchii* type D) was followed by slight benefit: no acute cases subsequently occurred, and recovery was quicker after treatment. Changes in feeding should be made gradually. In certain cases (Saanen breed) idiosyncrasy to serum injections may occur.

—W. R. BETT.

MÉRY, F. (1947.) Le botulisme chez le chien. **[Botulism in the dog.]**—*Bull. Acad. vét. Fr.* **20.** 28–37. **309**

The general syndrome is described as: dullness, ocular manifestations—congestion of the sclera, keratitis, dullness of the cornea, difficulty in accommodation and sometimes more severe eye lesions, anorexia, constipation, difficulty in swallowing, muscular paralysis in the neck and shoulder region, atrophy of the tissues in the temporal fossa, weakness and incoordination.

—G. V. LAUGIER.

PLASTRIDGE, W. N., & WILLIAMS, L. F. (1948.) **Vibrionic abortion in cattle: second report.**—*Cornell Vet.* **38.** 165–179. [Authors' summary slightly amended.] **310**

In the diagnosis of vibrionic abortion both bacteriologic and serologic methods should be used. Specimens examined for the presence of *V. foetus* should be examined microscopically and cultured on blood agar, and in soft agar (0·3 per cent agar in liver infusion broth). Blood samples from aborting cows should be submitted within a period of ten days following abortion. The presence of *V. foetus* infection in brucellosis-free herds may cause an annual abortion rate of from 4 to 20 per cent and a lowered conception rate. Early abortion (50 to 90 days after conception) appears to be more common in *V. foetus* infection than in brucellosis.

The incidence of infection, as indicated by the agglutination test and abortion, appears to reach a peak soon after the start of infection, and gradually to decrease thereafter until either infection disappears entirely or a new cycle of infection is started among the young heifers.

About 75 per cent of animals that react positively to the agglutination test become negative in less than six months. Heifers under one year of age appear to possess a natural resistance to infection that decreases soon after they reach sexual maturity. The presence of *V. foetus* agglutinins in the sera from several bulls suggests that bulls may be susceptible to infection.

ROBERTS, S. J., KIESEL, G. K., & LEWIS, N. F. (1948.) **Foot rot in cattle: A small controlled experiment.** — *Cornell Vet.* **38.** 122–130. [Authors' summary copied *verbatim.*] **311**

One hundred and thirty-six cattle affected with foot rot were divided into five groups for a comparison of treatments. The cattle in three groups received a single intravenous dose of sodium sulfapyridine, sodium sulfamerazine, or sodium sulfamethazine. Those in a fourth group received a single oral treatment with sulfapyridine. A fifth group were used as controls, and received only an injection of dextrose solution.

In this experiment, although the results of a single treatment with sulfonamides were slightly better than was obtained in the untreated controls, as judged by the necessity for a second or subsequent calls for treatment, the difference was not great enough to indicate that sulfonamide therapy for foot rot is greatly superior to former methods used in treatment. There is as yet no specific treatment for foot rot; each case must be treated individually by general or local treatment, or a combination of methods decided upon by the veterinarian.

MCTIER, L. A. W. (1948.) **Mycotic dermatitis in cattle in N.S.W.**—*Yearb. Inst. Insp. Stk N.S.W.* 1948. p. 81. **312**

This is a note recording the presence of mycotic dermatitis in cattle in New South Wales. Three cows developed horny, brownish scabs on the back, rump and sides. Microscopic examination of preparations from the scabs revealed the presence of numerous organisms morphologically identical with *Actinomyces dermatonomus*, the causal organism of mycotic dermatitis in sheep.

—D. F. STEWART.

KLIENEBERGER-NOBEL, E. (1947.) **The life cycle of sporing *Actinomyces* as revealed by a study of their structure and septation.**—*J. gen. Microbiol.* **1.** 22–32. **313**

Four sporing *Actinomyces* species (*A. gardneri*, *A. albosporeus*, *A. chromogenes*, *A. madurae*) were studied by following the development of Feulgen-positive chromatinic structures and bacterial membranes. Two phases of growth, differing in morphological structure were seen, firstly the primary mycelium which produced "initial cells"; and secondly the aerial mycelium arising from the initial cells. The aerial mycelium

nuclear structure divided into rod- or dumbbell-structures, two of which fused to form the spore nucleus which, with cytoplasm and membrane, gave the spore. The spores then reproduced the primary mycelium.—MALCOLM WOODBINE.

BOAND, A., & NOVAK, M. (1949.) **Sensitivity changes of *Actinomyces bovis* to penicillin and streptomycin.**—*J. Bact.* **57.** 501–508. [Authors' conclusions copied *verbatim*.] **314**

The effect of penicillin and streptomycin has been tested on six strains of *Actinomyces bovis in vitro*. Under the conditions of the test it was found that: Penicillin was inhibitory in concentrations varying from 0·05 to 0·5 units per ml. Four strains showed the development of a slight stepwise increase in resistance to penicillin after 16 transfers, but did not develop further resistance after 32 transfers over a period of 3 months. Two strains showed no increase in penicillin resistance. Although the resistance developed to penicillin was somewhat higher than the original sensitivity of the organisms, the strains did not become readily adapted or resistant to the antibiotic effect of penicillin.

All six strains tested were originally inhibited by 30 units per ml of streptomycin. The six strains all developed at least a 250-fold increase in streptomycin resistance in 10 transfers. The resistance of five strains was retained after 54 transfers in streptomycin-free medium. One strain reverted to its original sensitivity after 45 transfers, however. Streptomycin dependence did not develop. There were no morphological changes in the resistant strains. Slight biochemical changes in the metabolic processes of the resistant strains occurred. No detailed studies of this were conducted. Streptomycin resistance does not affect the penicillin sensitivity of the various strains.

Penicillin appears to be more effective *in vitro* than does streptomycin on the six strains of *Actinomyces bovis* used in these experiments.

SALVIN, S. B. (1949.) **The serologic relationship of fungus antigens.**—*J. Lab. clin. Med.* **34.** 1096–1104. [Author's summary and conclusions copied *verbatim*.] **315**

Complement fixation methods were employed in the determination of the specificity of and the relationship between antigens from *Aspergillus fumigatus*, *Blastomyces dermatitidis*, *Candida albicans*, *Coccidioides immitis*, *Histoplasma capsulatum*, and *Mucor corymbifer*. Sera from animals experimentally infected or hyperimmunized with one of the pathogenic fungi were absorbed with each of the six fungal antigens. Also, sera from experimentally infected rabbits were examined by complement fixation tests to determine the extent of their reactions with homologous and heterologous antigens.

A. fumigatus and *M. corymbifer* were probably antigenically unrelated to the other four species, since they failed to absorb antibodies from any of the heterologous antisera. Although *B. dermatitidis* antigen was the least specific complement-fixing antigen of the four remaining, it produced the most specific antibody. Its antiserum reacted with the homologous antigen and slightly with the *H. capsulatum* antigen and was absorbed by the *H. capsulatum* antigen and to a lesser extent by the *C. albicans* and *C. immitis* antigens. *H. capsulatum* antigen produced serum that reacted about equally with homologous antigen and *B. dermatitidis* antigen, and that was absorbed by *B. dermatitidis* antigen and to a lesser extent by the *C. albicans* and *C. immitis* antigens. The latter two antigens produced sera that fixed complement with and were absorbed by two of three heterologous antigens, namely, *B. dermatitidis* and *H. capsulatum* antigens.

FREAK, M. J., & JOSHUA, J. O. (1948.) **Some further observations on the use of penicillin in canine leptospirosis.**—*Vet. Rec.* **60.** 252. **316**

The authors compare the results of treatment with penicillin of *Leptospira canicola* and *L. icterohaemorrhagiae* infections in dogs. In cases found by subsequent agglutination tests to be caused by *L. canicola*, response to the treatment was spectacular, dosage for seven days usually being sufficient to prevent relapse. Cases proved by the same method to have been caused by *L. icterohaemorrhagiae* gave little and slow, or no response to penicillin therapy, response becoming apparent only after three or four days, compared with one day in the other group. They recommend that if response is delayed, treatment should be reinforced by anti-leptospira serum.—R. M. L.

COLLIER, W. A. (1948.) "Maladie des porchers" in Niederländisch-Indien. [**"Swineherd's disease" in the Dutch East Indies.**]—*Schweiz. med. Wschr.* **78.** 508–509. [Abst. in *Bull. Hyg., Lond.* **23.** 685. (1948), slightly modified. Signed: J. C. BROOM.] **317**

Six strains of leptospirae were isolated from 104 healthy pigs from a farm in Batavia by the inoculation of kidney material into culture medium. All these strains had a low pathogenicity for guineapigs, the organisms being present in the peritoneal fluid for a few days only. The infectivity for mice was low also. The serological type of the strains was determined by testing living cultures against a series of known antisera, and also by testing antisera prepared against the new strains against known leptospira species. The newly isolated strains all agglutinated *L. pomona*

antiserum to full titre (1/25,000–1/50,000) but showed little or no reaction (1/10–1/250) with any of the other 15 species. Similar results were obtained when the new antisera were tested against the known leptospirae.

Sera from 64 other pigs were tested against the known leptospirae with the following results :– Thirty of the sera reacted positively with *L. pomona*, four reacted positively with *L. icterohaemorrhagiae*, one with *L. autumnalis* and one with *L. pyrogenes*. The remaining 28 sera were negative to all the above species.

Tests were then made on the sera of 25 persons (including 7 women), working on the pig farm, none of whom gave a history suggestive of past leptospiral infection. Of these, 13 (including 2 women) reacted positively with *L. pomona*, 4 with *L. icterohaemorrhagiae*, 4 with *L. bataviae*, 1 with *L. pyrogenes* and 1 with *L. australis*. Since hundreds of tests on persons not in contact with pigs were negative, it is concluded that a large proportion of workers among pigs become infected with *L. pomona*. However, whereas swineherd's disease in Switzerland presents a distinctive clinical picture, it appears that the infection in the Dutch East Indies is practically symptomless. *L. pomona* has never been found during the examination of thousands of rats in Batavia, but it was isolated in a single instance from a dog. The author suggests that the dog may act as a carrier from pig to pig and from pig to man.

GRELLAND, R. (1946.) Meningitis leptospirosa. Meddelelse om to tilfelle. [**Meningitis leptospirosa. Report of two cases.**]—*Nord. Med.* **32.** 2581–2586. [English summary.] **318**

G. reports two cases of *Leptospira* infection in human beings, one of *L. icterohaemorrhagiae* in a boy, the other of *L. canicola* in a young housewife. In both cases there were signs of meningitis and the fever lasted one week. The titres with *L. icterohaemorrhagiae* and *L. canicola* respectively were 1 : 160 on the tenth, 1 : 2,560 on the 16th day, and 1 : 320 on the ninth, 1 : 12,800 on the 18th day. In both cases there was a complete absence of symptoms related to the kidneys, liver and other organs, but in the second case leptospira were found in the urine.

The source of infection in the second case was an apparently healthy puppy, which three and a half months after infection was found to have leptospira in the kidneys and a titre of 1 : 2,560 with *L. canicola*. Emphasis is laid on the importance of considering the possibility of leptospira infection in all cases of meningitis of uncertain origin.—F. E. W.

BORG-PETERSEN, C., & FAGROEUS, A. (1949.) **The influence of the antigen density and other factors on the serum titer in the agglutination-lysis-test for leptospirosis.**—*Acta path. microbiol. scand.* **26.** 555–567. [In English. Authors' summary slightly modified.] **319**

Experiments are recorded which show that *ceteris paribus*, the titer of a serum, found by the agglutination-lysis-test with living leptospira cultures, increases with decreasing antigen density, the relation between antigen density and serum titer being previously determined. Increasing age of the culture seems to influence the serum titer in two ways. Apparently the " sensitivity " of the leptospira decreases with increasing age and for this reason the serum titer would decrease. However, a decrease in antigen density with increasing culture age may counterbalance, or even overcompensate, the decrease in " sensitivity ".

No influence on the serum titer was observed in the authors' experiments by the use of different batches of culture medium. However, according to other workers the serum titer may be influenced considerably by variations in the " sensitivity " of a given leptospira culture, probably because of factors in the culture medium. The possibility and the importance of a standardization of the agglutination-lysis-test (and of the agglutination-test with formolized cultures) are discussed.

VAN RIEL, J. (1948.) Perfectionnement des méthodes biologiques permettant de déceler des leptospires pathogènes dans l'eau. [**Methods for determining the presence of pathogenic leptospira in water.**]—*C. R. Soc. Biol., Paris.* **142.** 564–566. **320**

Rather elaborate details are given for the exposure of the shaved abdomen of a g. pig by immersing it to the necessary level in a basin containing the water to be tested, cultures being put up from the heart blood later.—I. W. J.

KLIENEBERGER-NOBEL, E. (1949.) **Origin, development and significance of L-forms in bacterial cultures.**—*J. gen. Microbiol.* **3.** 434–443. [Author's summary slightly modified.] **321**

Several Gram-negative bacteria produce pleuropneumonia-like (L-) forms, some under ordinary cultural conditions, others only when exposed to abnormal ones. The formation of these bodies starts with the production of small nuclear elements surrounded with a thin cytoplasmic layer; these elements fuse with neighbouring elements and the L-body is complete. Whereas some L-strains reproduce themselves indefinitely, others revert to the bacterial form. Thus the bacterial and the L-forms are now regarded as two different generations of the same organism and the author's symbiosis theory is abandoned.

WOODS, D. D. (1948.) **Wider aspects of studies of the nutrition of micro-organisms.**—*Brit. med. Bull.* **5.** 308–312. 322

This is a succinct exposition of the "essential metabolite" concept and its applicability to studies in bacterial chemotherapy and bacterial nutrition. From observations to date it would appear that the same essential metabolites are required by all animal cells and by cells of micro-organisms, and it is suggested that findings concerning the metabolic function of essential metabolites in micro-organisms will, in the main, be applicable to other cells. There are, however, certain substances (*e.g.* fat soluble vitamins and ascorbic acid) the role of which in the nutrition of micro-organisms has not yet been established. Results derived from micro-organisms are of intrinsic interest and may give a valuable directive for studies upon other types of cell, but they must not be taken to apply to other cells without confirmatory evidence.

The biosynthesis of tryptophane is discussed as a successful example of the nutritional approach to the study of the biosynthesis of essential metabolites.—ALASTAIR N. WORDEN.

See also absts. **352** (culture filtrates); **386** (bacteriophage); **398** (*Salmonella pullorum*); **465** (bacteriostasis); **467** (*Salmonella, Klebsiella*); **468** (penicillin); **474-475** (ruminal flora); **493** (in milk); **495** (in pork); **514** (in sex organs of cows); **535** and **549** (books).

DISEASES CAUSED BY PROTOZOAN PARASITES

LUBINSKY, G. (1949.) **A galvanotactic procedure for the concentration of *Balantidium coli* in feces.**—*J. Lab. clin. Med.* **34.** 1154–1161. [Author's summary and conclusions slightly amended.] 323

A galvanotactic method for concentrating *Balantidium coli* from swine feces has been described. By using this concentration procedure, the percentage of positive results has been substantially increased from 56–92% in one hundred samples and from 34–52% in fifty samples from pigs from a different locality.

It is suggested that this galvanotactic method also may be employed for concentrating amoebae and other protozoan parasites in the faeces of man.

DAVEY, T. H. (1948.) **Trypanosomiasis in British West Africa.** pp. 15. London: H.M. Stationery Office. 2s. 324

In contrast to what obtains in East Africa, human sleeping sickness is still a disease of supreme importance in all the British West African territories. Animal trypanosomiasis is even more widespread and, although the indigenous W. African Shorthorn types are relatively resistant, any attempts to produce a more economic type by crossing or by the introduction to fly areas of better zebu cattle are frustrated.

The report deals almost entirely with human trypanosomiasis. The main method of control is by mass diagnosis and treatment. The organization differs in the different territories, but treatment is usually with antrypol. Tryparsamide is often used in late-stage cases. This method of control has given good results but elimination of the disease, believed to have followed its application in the French Cameroons, is not claimed in any British territory. Brief mention is made of the use of pentamidine curatively and in prophylaxis.

Some use of clearing, both defensive and aggressive, is made. This method of control, however, does not seem to have reached the same stage of development as it has in E. Africa. D. stresses the necessity for close collaboration between the many Government departments which must be involved in tackling a problem which affects the population in so many different ways.—J. RICHARD HUDSON.

HENDERSON, W. W. (1949.) **Control of trypanosomiasis in Africa. [Correspondence.]**—*Vet. Rec.* **61.** 255. 325

H. considers that the eradication of the tsetse fly is still the main problem. Antrycide cannot be used indiscriminately, but it may be of use to protect clean cattle travelling through a fly belt. Also, cattle could be made to act as baits for the tsetse fly if they were treated by both antrycide and gammexane.—M. J. LETHBRIDGE.

WILSON, S. G. (1949.) **Drug-resistance shown by trypanosomes following "Antrycide" treatment. [Correspondence.]**—*Nature, Lond.* **163.** 873–874. 326

Evidence is reported which suggests early development of drug-resistance following treatment with antrycide in the case of *Trypanosoma simiae* infection in pigs and of *T. congolense* and *T. vivax* infections in cattle. It is also suggested that strains resistant to antrycide are also resistant to phenanthridinium 1553. The evidence is mainly of failure to cure relapses by re-treatment.

Toxic symptoms were encountered in cattle when the dose rate exceeded 10 mg. per kg.; in some cases cattle died from 2–6 hours after treatment, in others there was severe gastro-enteritis with death between the 6th and 12th days after treatment.

The bearing of these findings on the use of this drug in the field is very briefly discussed.

—M. C.

WILSON, S. G. (1949.) **"Antrycide" treatment of *T. congolense-T. vivax* relapses and re-**

infections.—*Vet. Rec.* **61.** 395–397. **327**

Observations on the use of antrycide in the treatment of *Trypanosoma congolense* in cattle indicated that the drug could induce the development of resistant strains and that relapse strains which developed after treatment with antrycide prove resistant to dimidium bromide. Increasing the dosage had only a limited value in preventing the production of such strains, as grave toxic symptoms arise at dosage levels above 10 mg. per kg.—S. Brian Kendall.

Beaudiment, R., Brochen, L., & Peuziat, Y. (1949.) Note sur l'action curative du diamidino-diphénoxypentane administré par voie orale, dans la trypanosomiase humaine Africaine. **[Diamidino-diphenoxypentane given *per os* in human trypanosomiasis in Africa.]**—*Bull. Soc. Path. exot.* **42.** 18–22. **328**

In 50% of cases circulating trypanosomes disappeared after administration of doses of 20–30 mg. per kg. and cures were effected when 114–150 mg. per kg. were administered over a period of five days. When the drug was used as the dimethane sulphonate signs of intolerance were reduced.—Malcolm Woodbine.

Lowe, H. J. (1948.) **Trypanosome infection transmission by tsetse in Zanzibar. [Correspondence.]**—*Vet. Rec.* **60.** 309–310. **329**

L. directs attention to the importance of the finding of *Glossina austeni* on the island of Zanzibar for the first time by some members of the Tanganyika Veterinary Department. A heavy incidence of trypanosomiasis had been known on Zanzibar for years, but as no tsetse flies had ever been found on the island the trypanosome infection had been attributed to mechanical transmission by stomoxys and other blood-sucking insects.

No species other than *G. austeni* were found on Zanzibar.—M. C.

Kujumgiev, I. (1947.) Differenti qualità degli antigeni per la sierodiagnosi della durina degli equini, in rapporto al mezzo vivo colturale del *Trypanosoma equiperdum.* **[Various qualities of antigens for sero-diagnosis of dourine in horses, in relation to the cultural medium for *Trypanosoma equiperdum.*]**—*G. Batt. Immun.* **37.** 289–296. **330**

Trypanosomes from the white rat give the most satisfactory antigen preparations. Those from the dog, horse and g. pig are unreliable.

—Nesta Dean.

Mayer, R. L., & Brousseau, D. (1946.) **Development of immunity to reinfection during chemoprophylaxis of trypanosomiasis with a new antimony derivative.**—*Proc. Soc. exp. Biol., N.Y.* **62.** 238–240. **331**

A sodium salt derived from *p*-(2,4-diamino-1,3,5-triazinyl-6) aminophenylstibonic acid had long acting prophylactic activity in mice infected with *Trypanosoma equiperdum* following both subcutaneous and oral administration. Cured mice had an immunity against re-infection and passive transfer of immunity by blood serum was demonstrated.—M. C.

Hood, M. N. (1949.) *Trypanosoma equiperdum, Trypanosoma brucei* **and** *Trypanosoma hippicum* **infections in laboratory animals.**—*Amer. J. trop. Med.* **29.** 369–377. **332**

H. studied infections of *T. equiperdum, T. brucei,* and *T. hippicum* in white rats, white mice, rabbits, hamsters, cotton rats, g. pigs and deer mice. Using standardized inocula the incubation period and duration of infection were observed in each species. The three strains of trypanosomes produced the same general symptoms in each experimental host, but the disease in the white rat, white mouse, hamster and cotton rat was acute and fatal, accompanied by a uniform increase in the blood parasite count. It was observed that when all influencing conditions were standardized, the number of parasites in the blood at each stage of the disease was definite and predictable and the author suggests that this is a good *in vivo* method for the assay of trypanocidal compounds.

—K. B. Sinclair.

Culwick, A. T., & Fairbairn, H. (1947.) **Polymorphism in *Trypanosoma simiae* and the morphology of the metacyclic forms.**—*Trans. R. Soc. trop. Med. Hyg.* **41.** 415–418. **333**

In attempting to isolate a strain of *T. brucei* from a horse naturally infected with polymorphic trypanosomes, the authors inoculated blood into two sheep in series. From the second sheep clean, laboratory-bred *Glossina morsitans* were infected and the strain was transmitted cyclically in *Cercopithecus* monkeys for six months. Examination of the first monkey's blood revealed that the parasite was *T. simiae* and not *T. brucei.* It was found that the fly had trypanosomes in the proboscis and gut only.

Hoare's work on the morphology of *T. simiae* was confirmed. Three forms were present, classical *simiae* forms, long and stout with a well-developed undulating membrane ; slender *rhodaini* forms with undeveloped membrane and *congolense*-like forms. Measurements showed that the lengths of each form had a frequency distribution which did not depart significantly from normality. About 24% of the long and none of the other forms were in a state of division. Two types of metacyclic forms occurred in the fly, one with and one without a free flagellum.

In a previous paper [*V.B.* **19.** 92] the authors described their finding that *T. rhodesiense*

has three blood and two metacyclic forms and they believe that in *T. simiae*, as in *T. rhodesiense*, the typical, long, stout forms are heterozygous and the others homozygous. On another occasion the authors obtained a strain of *T. simiae* when trying to isolate *T. brucei* from the blood of cattle. It is probable that the former are more common than is generally supposed. It is to be noted that in *T. congolense* the typical forms divide by binary fission; whereas in *T. simiae* the *congolense*-like forms never do. [The frequent occurrence of outbreaks of *T. simiae* infections in pigs exposed to fly in Kenya miles from any other domestic pigs, supports the authors' conclusion that this species may be widespread in other hosts in tsetse areas.]—J. Richard Hudson.

Seneca, H., Henderson, E., & Harvey, M. (1949.) **Purification of hemoflagellate cultures with antibiotics.**—*Amer. J. trop. Med.* **29.** 41. **334**

In a series of observations the authors found that neither penicillin nor streptomycin, nor a combination of the two, has any effect on the vitality and intensity of growth of *Leishmania donovani* and *Trypanosoma cruzi*.

They point out that the combined culture tubes, containing 5,000 units each of penicillin and streptomycin in a 5 ml. saline overlay, never became contaminated. This method can be used for the purification of haemoflagellate cultures.

—K. B. Sinclair.

Pierce, A. E. (1949.) **The agglutination reaction of bovine serum in the diagnosis of trichomoniasis.**—*Brit. Vet. J.* **105.** 286–294. **335**

The value of the serum agglutination test in the diagnosis of bovine trichomoniasis is discussed. When sera from trichomoniasis-infected herds were examined, a limited number of positive reactions was observed: 13% in outbreaks caused by the Belfast strain and 2% in outbreaks caused by the Manley strain. No strains other than these two were isolated and the Manley strain appears to be most widespread in Scotland, England and Wales, though it is necessary to carry out all diagnostic tests with both strains. The method is essentially a herd test and the best reactions are obtained from clinical cases, *e.g.* pyometra or abortion cases. Sera from normal and brucellosis-infected animals do not give a positive reaction to the test.—G. M. Urquhart.

Pierce, A. E. (1949.) **The mucus agglutination test for the diagnosis of bovine trichomoniasis.**—*Vet. Rec.* **61.** 347–349. **336**

Four hundred samples were tested by the mucus agglutination test for the diagnosis of trichomoniasis. Modifications on the original test are the dilution of the mucus samples to 1 : 10 and 1 : 20 to eliminate non-specific agglutination, and the use of both Belfast and Manley strains of *Tr. foetus* to obtain maximum specific agglutination. The mucus test detected a much higher percentage of positive reactors than the serum agglutination test, but it must still be regarded as a herd test.

The best type of mucus for the test is the scanty, opalescent, and mucoid "vaginal" type, while purulent mucus appears to be most suitable for the detection of the motile trichomonad. Mucus agglutinins persist for some time after recovery.—G. M. Urquhart.

Morgan, B. B., Lombard, L., & Pierce, A. E. (1949.) **Chemotherapy of *Trichomonas foetus* infections in rabbits.**—*Proc. Soc. exp. Biol., N.Y.* **70.** 243–246. **337**

The authors describe a standardized technique for infecting rabbits intravaginally with *Tr. foetus*. They discarded all rabbits in the vaginal exudate of which they failed to find large numbers of organisms during the first five days. By this method, the infection persisted in the 30 controls for a minimum of 30 days. Each of 58 infected rabbits was treated with a different compound, and a further series of ten rabbits each were tested with the three drugs, iodine, entozon (an acridine derivative), and merthiolate, which appeared to shorten the infection. Results were inconclusive.

—G. M. Urquhart.

Ebbell, H. (1948.) Die Bekämpfung der Geflügel-Kokzidiose mit Sulfonamiden. **[Control of coccidiosis (*Eimeria* infection) in fowls with sulphonamides.]**—*Schweiz. Arch. Tierheilk.* **90.** 202–207. **338**

After discussing the use of sulphaguanidine and sulphamethazine in the U.S.A., E. describes his own experiences with the latter drug. A 0·2% solution of sodium sulphamethazine is given as drinking water in a course of four and a half cycles each of four days. On the first day of each cycle treated water is given, followed on days 2, 3 and 4 with unmedicated water and ending the course by a day of treatment. Results have been satisfactory for prophylaxis.—J. E.

Cassamagnaghi, A., Jr. (1947.) La malaria en el Uruguay. **[Bird malaria in Uruguay.]**—*Bol. Mens. Direcc. Ganad. Urug.* **29.** 105; 237–246; & 356–410. **339**

C. reviews the literature and stresses the important part which the malarial parasites of birds have played in research into the chemotherapy of malaria and into the life cycle of the genus *Plasmodium*. He then tabulates the results of examination in Uruguay of 614 birds belonging to 38 species for malarial parasites. Seven different species of plasmodium were found and two

unidentified species. In eight out of 52 fowls examined *P. juxtanucleare* was found.—M. C.

ROUSSELOT, R. (1943.) Sur quelques hémocytozooses connues ou inconnues du Soudan Français. (Deuxième note.) [**Haemocytozoan infections in the French Sudan. II.**]—*Bull. Serv. zootech. Epiz. A.O.F.* **6.** No. 1, 2, 3 & 4. 75–83. **340**

Plasmodium epomorphi of a rodent (*Epomorphus gambianus*) is described: attempts to transmit infection to monkeys, a white rat and a mouse were unsuccessful. *Babesia perroncitoi* has been found by splenectomizing pigs and is described. *Hepatozoon rotundata* is reported from a dog which had recovered from an infection with *Hepatozoon canis*.

Rickettsia ovina was found in a batch of sheep in transit to Dakar. Heavy mortality had occurred during the journey. It is not clear whether *R. ovina* was the cause of the mortality.—M. C.

WINGSTRAND, K. G. (1947.) **I. On some haematozoa of Swedish birds with remarks on the schizogony of *Leucocytozoon sakharoffi*. II. Further studies on *Leucocytozoon sakharoffi*.**—*Kungl. Svensk. Vetenskapsakad. Handl.* **24.** No. 5. pp. 1–31; & No. 8. pp. 1–17. [Abst. in *Trop. Dis. Bull.* **46.** 615–616. (1949), copied *verbatim*. Signed: P. C. C. GARNHAM.] **341**

I. A description is given of six species of *Leucocytozoon* including a new unnamed one in a rook, and of two species of *Haemoproteus*, including a new one, *H. buteonis* in a buzzard. The endocrine glands of two young crows (*Corvus corone cornix*) showed the presence of the asexual forms of *Leucocytozoon*, *viz.* very striking megalo-schizonts. They were found in the anterior and posterior portions of the pituitary gland, in a testicle, and in the thyroid. The youngest schizonts appear to develop in endothelial cells of capillaries. The young schizont is composed of a few "cytomeres," 2–3μ in diameter, and each cytomere is surrounded by a vacuole. The nucleus of the host cell enlarges as does the cell itself; eventually the diameter of the nucleus is enlarged 40 times, the cell itself measuring 470μ. In these later stages, the cytomeres form a continuous layer around the nucleus; each is about 15μ in diameter and contains numerous merozoites visible as deeply staining granules 1μ in size. A zone of cytoplasm free from cytomeres surrounds the host cell nucleus. In adult birds this type of schizont was absent; a smaller kind in the hepatic parenchyma is described but whether the latter structures are truly parasitic even the author appears to doubt.

II. Material additional to that described above was examined in the organs of two half-grown crow nestlings which had suffered from very violent attacks of the disease (about 10 infected lymphocytes to 100 erythrocytes). The course of development of the megalo-schizonts was observed in the spleen where they occurred in abundance. The host cell appears to be a macrophage. Development is described all in terms of the "cytomere." The cytomeres split up into "sub-cytomeres," bladder-like bodies with the granules concentrated on the surface. Eventually, all differentiation is lost and a continuous mass of merozoites is formed outside the host cell nucleus. The merozoites exhibit bipolar staining. The ripe schizont bursts and discharges a cloud of merozoites into the adjacent blood vessels. The granules give a positive Feulgen reaction only in the final stages; earlier, the usual Romanowsky or haematoxylin stains fail to show any chromatin. This substance, however, can be impregnated with silver by using the Bodian technique and then is visible throughout the cycle.

[These observations confirm HUFF's work [*V. B.* **13.** 280] on another species of *Leucocytozoon*. The megalo-schizonts of the Swedish parasites, however, appear to be five times the size of the American ones, reaching nearly half a millimetre in diameter. In size, therefore, they form a link between the schizonts of *L. simondi* and the 2 mm. merocysts of *Hepatocystes kochi*. In the latter, the host cell becomes similarly enormously enlarged but the nucleus undergoes repeated divisions instead of growing into a body 190μ in diameter. The final product is alike in all three parasites, *viz.* a compressed mass of innumerable bipolar-staining merozoites, which escape into the blood to form gametocytes.]

DICKSON, C. (1949.) **Canine babesiasis: the problem of parasite fastness and the biliary fever relapse. Trials with "paludrine" as a therapeutic agent.**—*Brit. Vet. J.* **105.** 305–309. **342**

D. states that unsatisfactory response to treatment of babesia infection in dogs in S. Africa with such drugs as trypanblue, pirevan and phenamidine is becoming increasingly common and he postulates that this may result from the development of drug-resistant strains of the organism. He has tried paludrine on a small number of cases. The dose *per os* was from 0·05 g. to 0·2 g. daily. Paludrine lactate was used intramuscularly in some dogs in doses of 2–4 ml. Results were inconclusive, but it did appear to be useful in some cases. [It is not easy to be certain whether D. was dealing with *B. canis* or *B. gibsoni* infections or with mixed infections. He mentions both organisms and also says "Routine smear examination fails to distinguish the species,"

a rather surprising statement. *B. gibsoni* is essentially an Asiatic species and there appears to be some doubt concerning its occurrence in S. Africa.]—M. C.

See also absts. **534** (book, tropical medicine); **538** (book).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

BORISOVICH, F. (1946.) **[Foot and mouth disease in cattle. (Symposium).]**—*Veterinariya, Moscow.* **23.** No. 10–11. pp. 23–26. **343**

B. records observations of various authors on F. & M. disease.

I. He describes milk cure (lacto-therapy), stated to have been used with success on several thousand head of cattle, sheep and pigs, obviating virus immunization. Complete immunity was claimed and F. & M. infected cattle, even with concurrent mastitis, recovered in 3–4 days. The technique consisted of boiling for five min. skim milk taken from healthy cows, cooling it to 37°C. and injecting intramuscularly on two occasions at an interval [period not stated]. Infected cows with temperatures of 39·5°C. and over were given 80 ml., 100 ml. and 100 ml. at intervals of one day; calves up to one year old, 10 ml.; heifers up to two years old, 20 ml.; unweaned pigs, 5–10 ml.; pigs 2–4 months old, 10–20 ml.; pigs 4–6 months old, 20–30 ml.; adult pigs, 50 ml.; lambs up to two months old, 5 ml.; over two months old, 10–20 ml.; and sheep, 20 ml. A single injection appeared to be particularly effective when administered to nursing sows and ewes infected with F. & M. disease and mastitis. Lactation was speedily restored and the animals recovered quickly.

II. Cattle, sheep and goats were fed with preparations of hips, yeast and vitamins A, E, B & C as prophylactic and therapeutic measures with marked beneficial effects. In treated calves no deaths occurred; but 36·7% of non-treated calves died.

III. Galy's chloroform vaccine kept for five days and injected twice, intradermally and subcutaneously, gave 100% immunity.

IV. After tests on small numbers, chloroform-saponin vaccine was injected into 1,059 cattle of all ages which were then pastured for 2–3 months among infected herds. All remained healthy, as revealed also in P.M. examination. G. pigs injected with serum from these animals also remained healthy. A herd of 100 vaccinated cattle was run with 50 controls and all infected 15 days later with F. & M. disease *via* the tongue. All the controls developed the disease, but only one of the immunized cattle.

V. Subcutaneous injections of formolized virus vaccine prevented sheep and goats from becoming carriers, which they are apt to become because often no clinical signs of the disease are apparent.—F. A. A.

SCHANG, P. J. (1948.) La fiebre aftosa, como zoonosis. **[Foot and mouth disease in man and animals.]**—*Proc. 1st Congr. Zoonosis, Buenos Aires.* **1.** 51–59. **344**

In exceptional cases F. & M. disease is transmissible to man when conditions of susceptibility in the individual are favourable. S. considers it essential for correct diagnosis in such cases to send the suspected material to a specialist F. & M. disease laboratory for examination.—E. G.

NUZZI, A. F. (1948.) La febbre aftosa e l'uomo. (Contributo casistico.) **[Foot and mouth disease in man.]**—*Acta Med. Italica.* **3.** 127–128. [Abst. in *Bull. Hyg., Lond.* **23.** 686–687. (1948), copied *verbatim.* Signed: H. HAROLD SCOTT.] **345**

In May, 1946, some cattle were transferred from the plains of Puglia where foot-and-mouth disease was present. It was hoped that by removing them they might escape infection, but they were probably in the stage of incubation, for they soon showed the characteristic signs. While they still appeared healthy their milk was given to children. Notes of three children thus affected are related, their ages being 9, 15 and 9 months. Two adult cases are also reported; one a man of 38 who milked the animals, the other 40 years of age, proprietor of the animals who tended the feet and mouths of them and 10 days later himself fell sick. The symptoms were similar in all: fever and malaise for a couple of days and then sore mouth with aphthae showing on the tongue and buccal mucous membrane.

DUJARRIC, R. (1947.) Installation de locaux destinés à des animaux inoculés de virus dangereux. **[Design of accommodation for cattle used as virus producers.]**—*Bull. Off. internat. Epiz.* **27.** 280–282. **346**

Suggestions, with two plans, are made for the construction of a laboratory designed for the study of infectious diseases of large animals without risk of escape of infection. These suggestions are incomplete and do not make provision for storage of fodder for the animals nor a rest room for personnel.—M. C.

I. CAPORALE, G. (1948.) Sull'eziologia della miocardite aftosa. **[Aetiology of foot and mouth disease myocarditis.]**—*Zooprofilassi.* **3.** 173–184. [English summary.] **347**

II. LANFRANCHI, A. (1948.) Sull'-eziologia della miocardite aftosa. **[Aetiology of foot and mouth disease myocarditis.]**—*Ibid.* 210–211. **348**

I. C. examined 15 cases of myocarditis associated with F. & M. disease and, although it was possible to isolate various bacteria from the myocardium, he concluded that the condition was specific to the virus infection and not due to the secondary bacterial invasion.

II. L. suggests a misinterpretation by CAPORALE of some earlier work on secondary bacterial infection quoted by C. [see preceding abst.].—W. M. HENDERSON.

BELIN, M. (1948.) Les complexes vaccino-aphteux, leurs caracterès essentiels. [**Reaction of inoculation of mixed foot and mouth disease and vaccinia vaccines.**]—*Bull. Acad. vét. Fr.* **21.** 221–226. **349**

B. made a further attempt, by answering adverse criticism, to justify his belief in the efficacy of his vaccine.—W. M. HENDERSON.

HENDERSON, W. M. (1949.) **The quantitative study of foot-and-mouth disease virus.**—*Agric. Res. Coun.* Rep. Ser. No. 8. pp. 49. London: H.M. Stat. Off. 2s. 6d. **350**

H. describes the development of the present Pirbright system of titrating F. & M. disease virus on the tongues of cattle. The various stages in the evolution of the method explain the reasons for the perfected technique. In its final form this is as follows:–two cattle are used for each titration. They are anaesthetized with pentothal sodium, given intravenously, and the tongue is then held in the left hand with the help of a piece of rough towelling. The lowest dilution is inoculated first, five longitudinal, parallel, intradermal insertions of the needle being made at approximately equal distances across the breadth of the organ and just in front of the prominence of the dorsum. From 0·1–0·2 ml. is injected at each stroke. Using a fresh syringe the next tenfold dilution is then given as a second row of five lines. Continuing, two further dilutions can be administered in the same way before the area near the tip with its numerous, large, conical papillae is reached.

The two animals are examined at suitable periods after inoculation (depending to some extent on the strain of virus) in order to ascertain at which sites *primary* vesicles develop. From the results of the inoculations in the two animals, in all ten sites with each dilution, the 50% end-point is determined by the method of Reed & Munch (1938).

Experiments showed that there was no significant variation in susceptibility of different sites in the area of tongue covered. Where the probable end-point is known, the first row of inoculations may be made up of several of the lower dilutions in order to economize in cattle. Four is the maximum number of rows of lines that can be used with comfort. Four- or sixfold dilutions can be used if the end-point can be guessed with sufficient accuracy.

From a statistical examination of the results of 60 titrations it was found that in comparing the results of two titrations obtained by the method of simultaneous multiple inoculation of two cattle, a tenfold difference would be significant but an eightfold would not. With strains of normal invasiveness, the " between tongue " error, caused by slight variations in the susceptibility of the two cattle in the test, remains fairly constant; but with strains of low invasiveness the difference in the reactions of the two animals may be most marked.

In comparing the potency of two suspensions of virus, they may be titrated on opposite sides of the tongue, giving two injections with each dilution of each suspension. If two cattle are used, one can expect to detect a tenfold difference, with four cattle a fivefold difference. For very close comparisons, where the approximate end-points are known, it is possible to use the calculated 50% end-point dilutions and inoculate four cattle on ten sites with each of the two suspensions. By a graphical method, the difference between the two suspensions can be estimated. A twofold difference in potency is probably significant. H. gives some of the information gained as a result of the quantitative study of the virus by the methods described.

The mean 50% positive dilution for three well-adapted g. pig strains titrated, after filtration, on g. pigs was strain No. 1 (a Vallée O) $10^{-6\cdot4}$, strain GB (a Vallée A) $10^{-6\cdot3}$ and strain GC (a Waldmann C) $10^{-6\cdot0}$. In this connexion H. demonstrated, by mathematical treatment of experimental data, that three g. pigs per dilution are insufficient to define the 50% end-point.

Strains well-adapted to g. pigs may yield a lower titre when titrated in cattle than they do when titrated in g. pigs. Strains of bovine origin will always yield a higher titre when titrated in cattle. This is true whether the virus content of blood or vesicle epithelium is titrated.—J. R. H.

GIROUD, P., & JEZIERSKI, A. (1948.) Comportement de divers petits animaux à l'inoculation de virus aphteux O après passages alternés cobayes-lapins. [**Pathogenicity for some small laboratory animals of foot and mouth disease virus type O after alternate passage in g. pigs and rabbits.**]—*C. R. Soc. Biol., Paris.* **142.** 1474–1476. **351**

Mice, g. pigs, rabbits, eight rats, a few cats, one dog, two cocks, one canary and one monkey were inoculated by various routes with an O type strain of F. & M. disease virus that had been given 40 alternate passages in g. pigs and rabbits. Virus

was recovered from the lungs of mice kept at 3°C. inoculated by the intranasal route and from the lungs of g. pigs and cats inoculated into the trachea.—W. M. HENDERSON.

RAMON, G., RICHOU, R., THIERY, J.-P., & LUCAS, A. (1948.) De l'action de certains complexes antagonistes sur le virus aphteux. [**Action of certain antibiotic culture filtrates on foot and mouth disease virus.**]—*Rev. Immunol. Thérap. antimicrob.* **12.** 127–130. **352**

No survival of F. & M. disease virus was detected after 24 hours at 26°C. in mixtures of virus and a filtrate of a *Bacillus subtilis* culture, whereas a filtrate of an *Actinomyces griseus* culture had no inactivating effect.—W. M. HENDERSON.

I. WEYL. (1949.) Zur Inbetriebnahme der Maul- und Klauenseuche-Virus-Vakzine-Stationen Hannover-Eystrup. [**Opening of the Hanover-Eystrup Foot and Mouth Disease Laboratories.**]—*Dtsch. tierärztl. Wschr.* **56.** 69–70. **353**

II. REPPIN, K. (1949.) Die Maul- und Klauenseuche-Virus-Station Hannover. [**The Hanover F. & M. Disease Virus Laboratory.**]—*Ibid.* 71–72. **354**

III. SCHWECKENDIEK, O. E. (1949.) Die Maul- und Klauenseuche-Vakzine-Station Eystrup. [**The Eystrup F. & M. Disease Virus Laboratory.**]—*Ibid.* 72–73. **355**

IV. GEIGER, W. (1949.) Die Maul- und Klauenseuche in der britischen Zone. [**F. & M. disease in the British zone.**]—*Ibid.* 74–76. **356**

I. Since the occupation of Germany after the 1939–45 war, the Western zones have been cut off from the former German Foot and Mouth Disease Institute on the island of Riems. At the end of 1948 a F. & M. disease vaccine production Institute was opened at Hanover under the direction of GEIGER. This consists of a virus production unit in charge of REPPIN at Hanover and a vaccine preparation unit in charge of SCHWECKENDIEK at Eystrup.

II. A more detailed description, including a plan, of the Hanover virus production unit. This has accommodation for 70 cattle and has the necessary facilities for personal disinfection, disposal of infective material, slaughter of the animals and hanging of the infective carcasses for the 48 hours required by veterinary-police regulations.

III. A description, with plan, of the Eystrup vaccine preparation unit. This is of a size enabling the virus production unit to prepare 1,000 litre batches of aluminium hydroxide vaccine.

IV. A review of the occurrence of F. & M. disease in north-western Germany during the last 20–30 years emphasizing the importance of having a vaccine production Institute available for this region.—W. M. HENDERSON.

PIRINGER, W. (1945.) Tollwut durch Schleimhautinfektion. [**Transmission of rabies through mucous membranes.**]—*Schweiz. Zeitschr. Path. Bakt.* **8.** 245–252. [English, French & Italian summaries.] **357**

Six out of 20 g. pigs given intranasally a 10% saline brain suspension of a passaged rabies virus developed rabies after 4–12 days. One out of ten g. pigs given one drop of brain suspension *per os* developed rabies after 87 days. Twenty g. pigs to which a suspension of the submandibular gland was applied by scarification of the tip of the nose remained healthy. Further attempts to transmit infection were made by inoculation of the penis, nose tip and cornea with brain suspension. All g. pigs remained healthy.

From these experiments P. concludes that transmission of rabies in dogs by simple contact of mucous membranes under natural conditions is very rare.—E. G.

VEERARAGHAVAN, N. (1947.) **Cultivation of rabies virus** *in vitro*. [**Correspondence.**]—*Nature, Lond.* **159.** 782. **358**

Having previously obtained evidence suggesting multiplication of the rabies virus in a medium containing steamed sheep-brain extract, sheep serum, glycine and peptone the author investigated the effects of adding certain amino acids and accessory factors to the medium. He claims that his cultivation of the rabies agent on a cell-free medium indicates that it is not a virus in the accepted sense.—M. C.

MCCLEAN, D. (1949.) **"Purification" of vaccine lymph.** — *Lancet.* **257.** 476 – 477. [Author's summary slightly modified.] **359**

The routine use of phenol to obtain rapid reduction of the bacterial contamination of vaccine lymph is described. The procedure is extremely simple, and lymph so treated can be issued for vaccination a fortnight from the date of trituration of the crude vaccine pulp. The quaternary ammonium detergent roccal, used either as a spray on the vaccinated area or in the treatment of the ground vaccine pulp, acts as a bacteriostatic rather than a bactericidal agent. It is therefore less suitable than phenol.

The author added a footnote stating that after submitting this note for publication he had learnt that Gins (1924) and Lehmann (1937) recommended the use of phenol in the purification of vaccine lymph, and that Stevenson and Butler (1939) stated that 0·5% phenol could be used to prevent accidental contamination of vaccinia cultivated in the embryonated egg. It was never-

theless still true that the use of phenol in the routine preparation of vaccine lymph was not generally known.

ANGULO, J. J., RICHARDS, O. W., & ROQUE, A. L. (1949.) **Demonstration of viral inclusion bodies in unstained tissue sections with the aid of the phase microscope. I. The inclusion bodies of yellow fever, herpes simplex, fowl pox, and distemper.**—*J. Bact.* **57.** 297–303. [Authors' summary copied *verbatim.*] **360**

By means of bright-contrast, phase microscopy, virus inclusion bodies were easily detected in unstained sections of tissues from yellow fever, herpes simplex, fowl pox, and distemper cases. The marked contrast and structural details shown by the inclusion bodies helped in their identification. The phase microscope offers promise for studies on the structure of inclusion bodies as well as in the diagnosis of virus diseases. Councilman bodies were observed in the liver of a child suffering a generalized herpes infection.

TSURUMI, M., OGASAWARA, K., FUJII, K., & SASAKI, Y. (1941.) **Studies on influenza virus (fifth report). Findings on the elementary bodies of influenza virus.**—*Jap. J. med. Sci.* Sect. VI. **2.** 1–7. [Abst. in *Bull. Hyg., Lond.* **17.** 283. (1942), copied *verbatim.* Signed: E. T. C. SPOONER.] **361**

The authors claim that elementary bodies may be seen in material from the lungs of mice infected with three different strains of the influenza virus (PR8, DC and WS), and that they may be stained with Giemsa's stain, or with a dye made by the Institute for Physical and Chemical Research, Tokio, or with Hosokawa's stain, or with Illuminol R, as recommended by NAKAMURA.

Some data are included concerning the preparation of elementary body suspensions by ultracentrifugation.

PANTHIER, R., CATEIGNE, G., & HANNOUN, CL. (1948.) Nouvelle technique d'étude du virus grippal. Premierès applications pratiques. **[New technique for study of influenza virus.]** —*Ann. Inst. Pasteur.* **75.** 338–350. **362**

This technique consists essentially of using the reaction of the cells of the mouse respiratory tract as an indicator for the presence of influenza virus. Twenty-four, 48 or 72 hours after intranasal inoculation, mice are killed, the trachea exposed and by means of a syringe and needle the respiratory tract is washed out with 0·25 ml. physiological saline solution. One drop is put on a slide and stained by Macchiavello's method and another drop is used for a haemagglutination test. The normal tracheal washing contains only a few cells of the epithelial lining. The washing from an infected mouse (strain PR8) contains numerous cells similar to those already described by the authors as occurring in lung smears from infected mice [*C. R. Soc. Biol., Paris* (1947.) **141.** 691] namely, cells with round or oval vacuoles arranged regularly throughout the cytoplasm, often with some deformity of the cell and, by 72 hours, numerous red-staining corpuscles are present. These corpuscles, however, are not regarded as being elementary bodies as suggested by TSURUMI *et al.* [see preceding abst.].

Suggested applications for this technique are correlation of haemagglutination titrations with infection, study of so-called "inapparent infections", serum neutralization tests, therapeutic experiments and vaccine potency tests. It is claimed that there is an advantage in this method over the more usual mouse tests, in that the response of the susceptible cells is observed during the period of multiplication of the virus instead of merely death of the mouse or the degree of lung consolidation.—W. M. HENDERSON.

FULTON, F., & DUMBELL, K. R. (1949.) **The serological comparison of strains of influenza virus.**—*J. gen. Microbiol.* **3.** 97–111. [Authors' summary copied *verbatim.*] **363**

The antigens of eight strains of influenza virus were compared by a simple and economical complement-fixation technique in which drops on Perspex sheets replaced larger volumes of reagents in racks of tubes. By this means more extensive tests were made with a limited supply of material than by standard tube techniques.

The specific antisera were prepared in mice, thus avoiding the elaborate isolation precautions necessary for ferrets, and sera from large groups were pooled to minimize individual variations between animals. The antigens were standardized in terms of the amount of complement fixed in the presence of excess homologous antiserum. The comparison of the strains is presented in the form of index numbers, ranging from 0 to 1·0; 1·0 represents complete identity of two strains, while the smaller numbers are taken to represent the degree of antigenic relationship between strains. Of the six strains examined which were isolated in different years, all were serologically distinct though the two B strains were closely similar and two of the A strains were fairly closely related. On the other hand, the three strains of influenza A virus isolated in 1947, two in London and one in the U.S.A., were identical.

FULTON, F. (1949.) **Growth-cycle of influenza virus. [Correspondence.]**—*Nature, Lond.* **164.** 189–190. **364**

A new method of complement fixation was used, previously described [see preceding abst.]. Chorio-allantoic membranes were infected with a

large number of PR8 elementary bodies, and batches were harvested at intervals, washed, and ground in a mortar to 10% concentration. Elementary bodies were first demonstrable in the allantoic fluid by red-cell agglutination 4–6 hours after infection. With the complement-fixation technique no rise of antigen was found at the second hour, but a rise occurred between two and four hours after infection, when the antigen is a mixture of specific and non-specific elements. The author suggests that the elementary body is formed in the membrane at the same time as the soluble antigen. The first elementary bodies are naked and specific. Later they are enmeshed with small tissue particles.—W. R. Bett.

Lübke, A. (1948.) Die Bedeutung der Resistenzprüfung für Diagnostik der infektiösen Anämie. **[Importance of the resistance test in diagnosis of infectious anaemia.]**—*Dtsch. tierärztl. Wschr.* **55.** 65–69. **365**

The red blood corpuscles of healthy horses resist lysis by sodium chloride concentrations between 0·44–0·62%. R.B.C. of horses with infectious anaemia have a wider range of resistance in terms of NaCl concentration, being resistant to higher as well as to lower concentrations.

By numerous resistance tests carried out at the same time as ordinary erythrocyte counts, evidence was collected that a finding of increased resistance is of subsidiary diagnostic value in cases in which medium anaemia is indicated by the direct count. It is said that the resistance test is negative in non-specific anaemia.—J. E.

Dreguss, M. (1949.) **Hemagglutination of chicken cells by serum of horses infected with the virus of infectious anemia.**—*Vet. Ext. Quart. Univ. Pa.* No. 116. pp. 3–13. [Author's summary copied *verbatim.*] **366**

Sixteen horses inoculated with the virus of equine infectious anemia developed agglutinating substances in their blood as tested against normal chicken red blood cells. The serum or plasma of horses produced hemagglutination, usually up to a dilution of 1 : 320 during the early stage of acute illness; the titer more or less decreased in the subacute stage. The sera of virus carriers showing no symptoms had quite low values. A number of normal horses were tested. Their serum either did not produce hemagglutination, or did so only in 1 : 10 to 1 : 20 dilutions. It was possible to exclude infectious anemia several times by the negative outcome of the test in field cases. However, there is indication that positive results may be obtained sometimes in conditions other than infectious anemia, possibly of virus origin. The implications of the findings have been briefly discussed. It has not been determined so far whether the hemagglutinin is connected with (a) the infectious agent, (b) the antibodies, or (c) some pathological component in the blood formed during the course of the disease. Further work is in progress to clarify the cause and the mechanism of the hemagglutination.

Rodionov, I. M., & Oleynik, N. K. (1946.) **[Viability of the equine infectious anaemia virus in water.]**—*Veterinariya, Moscow.* **23.** No. 10–11. pp. 11–14. **367**

Defibrinated blood from infected foals was diluted 1 : 500 in tap water and kept at room temperature in both sealed and open containers. A number of healthy foals were periodically injected intravenously and subcutaneously with one of these dilutions, the results demonstrating that infected water from the sealed and darkened jars retained its virulence for at least 158 days, becoming avirulent after 219 days; while in the exposed water, which was subject to decomposition, the virus became inactive after one month. The ammonia content of this water was high, up to 45 mg. per l.—F. A. A.

McIntyre, R. W. (1949.) **Virus papular dermatitis of the horse.**—*Amer. J. vet. Res.* **10.** 229–232. **368**

Within two months of the first observed case, 17 of a stable of 22 thoroughbred horses developed a non-irritant skin disorder in which small, concentric, firm swellings appeared. Scabs formed later which, when they dropped off, left desquamated, hairless, circumscribed areas. The course of the disease varied from ten days to six weeks. In a limited examination of material, a Seitz EK filtrate of a skin scraping suspension was passaged in 11-day incubated hens' eggs by the chorioallantoic membrane route. The embryos of all inoculated eggs died by the seventh day at the first passage and by 26 hours at the fifth passage. A similar, but milder and less extensive, skin condition developed in four horses inoculated with first passage allantoic fluid.—W. M. H.

Tassi, L. (1948.) L'episodio infettivo allo zoo di Roma. **[Rinderpest in the Rome zoo.]**—*Zooprofilassi.* **4.** 324. **369**

This is a comment on an article in a daily newspaper of 17th July, 1949, announcing that an outbreak of rinderpest had occurred in the Zoological Gardens at Rome and had been dealt with by the slaughter of all ruminants and swine including such valuable specimens as Indian buffalo, Tibetan yaks, various deer, giraffes and camels. Infection is said to have been introduced by antelopes brought from Somaliland, landed at Genoa and sent direct to the Zoo. On arrival at the Zoo they appeared to be in good health and

had certificates issued at Merca [Mogadishu ?] and Genoa.

Comment is made on the folly of permitting import of live animals from East Africa when the import of slaughtered carcasses from that area is prohibited. The lack of quarantine facilities and the lack of publicity given to the outbreak are also criticized.

The need for early notification of outbreaks of serious epizootic disease is stressed.—M. C.

RACHAD, A. M. (1948.) La vaccination contre la peste bovine avec le "virus de chèvre", en Egypte. **[Vaccination with rinderpest goat-virus in Egypt.]**—*Bull. Off. internat. Epiz.* **29.** 8–6. **370**

In this short article the use of goat-adapted virus for immunization of cattle in Egypt during 1945 and 1946 is stated to have given very bad results, but little direct evidence is given to support these charges.

The Kabete strain and later the Nigerian strain used on the advice of Edwards are said to have caused very severe reactions and to have spread the disease. Then a Kabete strain used on the advice of Daubney is stated to have given catastrophic results, to translate literally: "Thousands of animals died, thousands of cows aborted and thousands of pounds were spent by Government in compensation".

[The immoderate language in which the article is couched and the lack of precise figures to support the statements cannot fail to arouse doubt in the mind of the reader.]—M. C.

MINETT, F. C., & SEETHARAMAN, C. (1948.) Immunisation contre la peste bovine par le virus de chèvre. **[Rinderpest immunization with goat virus.]**—*Rev. Elev. Méd. vét. Pays trop.* **2.** 60–61. **371**

Commenting on an article by Rachad [see preceding abst.] reporting bad results obtained in Egypt from the use of goat virus, the authors state that there is no evidence in India that the goat-adapted virus is able to maintain itself under natural conditions. They find it astonishing that out of 11,706 cattle injected with goat virus thousands should have died and thousands aborted, as in India no such losses had occurred. On one occasion losses caused by a *Pasteurella* organism of caprine origin had occurred, but this is excessively rare. Outbreaks of rinderpest occur in India from time to time in sheep and goats, but the authors do not believe that these are caused by goat-adapted virus and they refute the statement of Rachad that "heavy losses are caused each year in India in sheep and goats as a result of adaptation of the virus to the goat."

SIMMONS, R. (1948.) Lettre de M. R. Simmons, Directeur des Services Vétérinaires de Nigeria. **[Letter from R. Simmons, Director of the Veterinary Services of Nigeria.]**—*Rev. Elev. Méd. vét. Pays trop.* **2.** 61–62. [In English.] **372**

S. states that the Nigerian strains of goat-adapted virus were used successfully in Egypt and caused negligible losses and the method has been adopted as the official method in Egypt since 1946. Three and a half million doses have been used with losses amounting to 0·1%. Daubney considers that Rachad [see two abstracts previous] erred in that he failed to distinguish between cases of the natural disease and reactions following vaccination with goat virus.—M. C.

SEETHARAMAN, C. (1948.) **Infectivity by contact of rinderpest virus, including goat-adapted virus, for cattle and goats.**—*Indian J. vet. Sci.* **18.** 69–76. **373**

Goats or cattle undergoing vaccination with goat-adapted rinderpest virus when kept in contact with healthy goats and cattle in a shed 50 × 20 feet or a chappar [small temporary shelters] ten feet square failed to spread the infection.

Infection could, however, be transmitted when animals were kept in a trevis facing each other, three feet apart, on the third, fifth, sixth and seventh day of infection so that the healthy animals could breathe the expired air of the infected ones.—M. M. SINGH.

SMITHBURN, K. C., HADDOW, A. J., & LUMSDEN, W. H. R. (1949.) **Rift Valley fever; transmission of the virus by mosquitoes.**—*Brit. J. exp. Path.* **30.** 35–47. **374**

In carefully controlled experiments the authors demonstrated the ability of culicine mosquitoes of the *Eretmapodites chrysogaster* group to transmit Rift Valley fever from lamb to lamb, from lamb to mouse, from mouse to mouse and from mouse to lamb by biting. When kept at 30°C. the period of incubation in the mosquito was 19–20 days.

Attempts to transmit with *Aedes aegypti*, *Taeniorhynchus fuscopennatus* and *T. uniformis* were unsuccessful. With the last two species difficulty was experienced in maintaining the mosquitoes alive in the laboratory sufficiently long to carry out tests after a reasonable incubation period and also in persuading the insects to take a second blood meal. Only a few *Aedes* were tested and the results with these three species, therefore, cannot be considered conclusive.

Eretmapodites chrysogaster is a forest species occurring in Uganda at an altitude of 2,500–3,000 feet. Moreover, it feeds by day. It is unlikely that it could be responsible for natural outbreaks in sheep and cattle in Kenya in open savannah

country at 6,000 feet. DAUBNEY & HUDSON [*V. B.* **4.** 469] found that during the course of an outbreak, protection of sheep from mosquitoes during the hours of darkness only was sufficient to prevent infection.—J. RICHARD HUDSON.

TUNNICLIFF, E. A. (1949.) **Ulcerative dermatosis of sheep.**—*Amer. J. vet. Res.* **10.** 240–249. **375**

Venereal disease (posthitis, balanitis, ulcerative vulvitis complex) was produced in both sexes of sheep by topical application of material taken from a case of infectious lip and leg ulceration ("Orf", or contagious pustular dermatitis). The original mouth lesions were again reproduced by using material taken from the venereal lesions. T. was unable to demonstrate conclusively the aetiology of lip and leg ulceration, but presents evidence which gives strong support to his theory that this disease is merely a variant of sheep venereal disease.—G. B. S. HEATH.

WEIPERS, W. L. (1949.) **Virus diseases in dogs.**—*Vet. Rec.* **61.** 319–325. **376**

In this address W. discussed, in the light of his own clinical experience, the virus diseases of the dog that occur in Great Britain, and dealt also with some virus diseases reported in other countries. The conditions dealt with, which are considered mainly from the viewpoint of clinical picture and differential diagnosis, were: distemper, experimental and field, resulting from the Laidlaw-Dunkin virus; epidemic (epizootic) encephalitis or "hard pad disease" (Group 1b of MacIntyre *et al.*); Group 2 disease of MacIntyre *et al.*, which, it is suggested, may include cases of "hard pad disease" from which the virus has disappeared owing to the long duration of the condition; disseminated encephalomyelitis [MACINTYRE *et al.*: Group 3, see *V. B.* **19.** 401]; hepatitis contagiosa canis, or fox encephalitis; and post-vaccination (distemper) encephalitis. Toxoplasmosis is also mentioned, as is lymphocytic choriomeningitis, the virus of which has been found in the central nervous system of dogs, but is not known to cause disease.

Discussion after the address dealt mainly with the clinical features of "hard pad disease" as encountered in various parts of the country. —E. COTCHIN.

HAIG, D. A. (1948.) **Further observations on the growth of Green's distemperoid virus in developing hen eggs.**—*J. S. Afr. vet. med. Ass.* **19.** 78–80. **377**

Green's ferret-adapted strain of distemper virus which was successfully passaged on the chorioallantoic membrane of the chick embryo [*V. B.* **19.** 340] is now in its 91st passage. A temperature of 37°C. appears to be more favourable to the multiplication of the virus than either 32° or 35°C. It was not possible to maintain the virus using the yolk-sac, allantoic cavity or amniotic cavity as routes of infection. Continual passage on the chorioallantoic membrane appears to be causing some loss of the highly contagious character of the virus and some attenuation of its virulence for ferrets.—M. C.

CHEEVER, F. S., DANIELS, J. B., PAPPENHEIMER, A. M., & BAILEY, O. T. (1949.) **A murine virus (JHM) causing disseminated encephalomyelitis with extensive destruction of myelin. I. Isolation and biological properties of the virus. II. Pathology.**—*J. exp. Med.* **90.** 181–194; 195–212. [Authors' summaries copied *verbatim.*] **378**

I. The isolation of a murine virus causing disseminated encephalomyelitis accompanied by extensive destruction of myelin in the central nervous system, and focal necrosis of the liver has been described. Young mice can be infected by a number of parenteral routes. Both encephalitic and paralytic signs can be observed. After intracerebral inoculation the virus has been isolated from brain, spinal cord, liver, lung, spleen, and kidney, but not from blood or from intestinal walls and contents. Hamsters, cotton rats, and Hisaw rats can be infected by the intracerebral route. Guinea pigs and rabbits appear to be insusceptible. Attempts to infect chick embryos have so far met with failure.

Under proper conditions the agent can pass through the usual bacterial filters. No inclusion bodies have been seen. No serological relationship to other neurotropic viruses has been demonstrated as yet.

II. A description has been given of the pathologic changes produced experimentally in animals by the inoculation of a virus material obtained from a mouse with spontaneous encephalomyelitis. The most distinctive feature of the lesions in the central nervous system is the widespread destruction of myelin. Giant cells derived from a variety of tissue elements characterize the early lesions. The liver in the majority of cases is the seat of focal necrosis. In some mice, infected with large doses by the intravenous route, there is produced massive necrosis of the liver, with fat infiltration and calcification. Giant cells are occasionally found in lymphatic tissue, but no significant changes were noted in other organs. Inclusions or elementary bodies were not demonstrated in the lesions. Similar lesions were produced by the inoculation of mouse virus into hamsters. In rats, the lesions were of a more chronic character.

The relation of this disease to other demyelinating diseases of man and animals is discussed.

HUANG, C-T., & EATON, M. D. (1949.) **The**

reversal by PABA of sulfonamide inhibition of the viruses of lymphogranuloma venereum and mouse pneumonitis.—*J. Bact.* **58.** 73–88. [Authors' summary copied *verbatim.*] **379**

Para-aminobenzoic acid reverses the action of minimal therapeutic doses of sulfonamides in mice infected by the intranasal route with the viruses of mouse pneumonitis or lymphogranuloma venereum. The PABA : sulfadiazine reversal ratios were between 800 : 1 and 200 : 1 in mice. PABA : sulfanilamide reversal ratios were between 4 : 1 and 1 : 1. Slight differences in the reversal ratios for the two viruses were noted. In chick embryos inoculated by the yolk sac route with either of these two viruses, the PABA : S.D. reversal ratios were between 1 : 2 and 1 : 10. The findings are similar to the results of analogous *in vivo* studies with bacteria.

Berthelon, M., & Tournut, J. (1949.) Identification de l'ultravirus, agent de la peste aviaire, dans la région Toulousaine. **[Identification of the fowl plague ultravirus in the Toulouse region.]**—*Rev. Méd. vét., Lyon et Toulouse.* **100.** 225–228. **380**

The outbreak studied appeared to be Newcastle disease, poultry and pigeons being affected, and new birds were vaccinated against this virus. A suspension of brains, liver, spleen and lungs from infected birds was prepared and a minimum lethal dose which killed a hen in ten days was calculated. Two vaccinated birds were tested by the injection of this dose and two others by ten times as much, and none developed symptoms, but four unvaccinated controls died. Two vaccinated birds were kept for a month in a cage previously occupied by three affected birds and developed no symptoms. It was concluded that the outbreak was Newcastle disease.—J. O. L. K.

Gordon, R. F., Reid, J., & Asplin, F. D. (1948.) **Newcastle disease in England and Wales.**—*Off. Rep. 8th World's Poult. Congr., Copenhagen. Vol. I.* pp. 642–650. [Danish & French summaries.] **381**

The widespread outbreak of Newcastle disease in England and Wales which started in 1947 is described. Infection was introduced by the importation of uneviscerated poultry carcasses from Hungary. Spread of infection occurred by the inclusion in swill, used for feeding poultry, of portions of the imported carcasses. At first the outbreak occurred mainly in small domestic flocks, but later larger flocks were infected; the largest flock consisted of 7,000 birds, all of which were slaughtered. The clinical features were variable. Some outbreaks had the classical explosive features with a very high mortality, others were much milder with a mortality as low as 5%. The haemagglutination inhibition test was of value in confirming diagnoses based on the clinical symptoms and P.M. lesions. The legislation enacted to control the disease is described.—M. C.

Le Dosseur & Lissot. (1949.) Vaccination en deux temps contre la peste aviaire, variété maladie de Newcastle. **[Immunization against Newcastle disease by an avirulent followed by a virulent vaccine.]**—*Bull. Acad. vét. Fr.* **22.** 221–224. **382**

Using a vaccine attenuated by formalin and followed in 15–35 days by a second vaccination by skin scarification of living virus diluted 1 : 30, the authors found that a good immunity was established.—D. Luke.

Florman, A. L. (1949.) **The agglutination of human erythrocytes modified by treatment with Newcastle disease and influenza virus.**—*J. Bact.* **57.** 31–38. [Author's summary copied *verbatim.*] **383**

Sera from patients with infectious mononucleosis, which agglutinate human red cells modified with Newcastle disease virus (NDV), do not agglutinate human cells modified by PR-8 or Lee viruses or by normal allantoic fluid (NAF). Not all patients with infectious mononucleosis develop the capacity to agglutinate NDV-treated cells. Serum from an occasional patient with hepatitis or serum sickness may also agglutinate these cells.

Anti-NDV rabbit sera contain several agglutinating factors for NDV-modified erythrocytes at least one of which appears to be specific. The agglutinating factors in anti-PR-8, anti-Lee, and anti-NAF rabbit sera are all removed by absorption with normal chick tissue. Serum from a patient convalescing from infectious mononucleosis that has a titer for NDV-modified cells comparable to that of an anti-NDV rabbit serum differs from the latter in that it does not contain any NDV agglutination-inhibition antibody.

Jungherr, E., Luginbuhl, R. E., & Kilham, L. (1949.) **Serologic relationships of mumps and Newcastle disease.**—*Science.* **110.** 333–334. **384**

Neutralizing and antihaemagglutinating antibodies against Newcastle disease virus were demonstrated in half of a number of patients convalescing from mumps. This finding suggests that a diagnosis of Newcastle disease in man should be made with caution, especially in the absence of virus isolation.—M. C.

Faber, H. K., Silverberg, R. J., & Dong, L. (1948.) **Poliomyelitis in the cynomolgus monkey. IV. Further observations on exposures confined to the stomach and intestines, with notes on the fecal excretion of virus.**—*J. exp.*

Med. **88.** 65–72. [Authors' conclusions copied *verbatim.*] **385**

The gastrointestinal mucosa appears to be relatively impermeable to poliomyelitis virus. On the experimental evidence as well as on anatomical grounds we regard the gastrointestinal mucosa as an infrequent and exceptional portal of entry. The experiments suggest that persistence of virus in the stools in poliomyelitis is due to excretion, presumably originating in infected nervous tissue, rather than to multiplication of the agent on intestinal epithelium.

Exposure of the gastrointestinal epithelium without resulting infection failed to produce immunity to intracerebral inoculation.

MONETA, E. (1948.) Ricerche sull'attività fagica delle acque luride dei macelli. **[The bacteriophagic properties of waste water from abattoirs.]** —*Nuova Vet.* **24.** 94–95. **386**

The waste water from the Bari abattoir and also water draining from sheep and cattle pens contained bacteriophages against several strains of bacteria, particularly dysentery bacteria.

No bacteriophage was demonstrated against typhoid-paratyphoid A bacteria, but there was some against the proteus and paratyphoid B group.—E. G.

FOWLER, C. B., & COHEN, S. S. (1948.) **Chemical studies in host-virus interactions. IV. A method of determining nutritional requirements for bacterial virus multiplication.**—*J. exp. Med.* **87.** 259–274. [Authors' summary copied *verbatim.* For previous parts, see *V. B.* **17.** 602; & **18.** 500.] **387**

Using the one-step growth technique the production of the virus T2 in its host, measured by latent period and burst size, was shown to depend on the nutritional environment of the host cell. When *E. coli*, grown in broth, was transferred to a simple medium, single organic compounds such as some amino acids and nucleosides were found to increase or accelerate the synthesis of virus. An antimetabolite of glutamic acid, an amino acid important for virus synthesis, was shown to be inhibitory. Several naturally occurring amino acids, leucine, serine, and cysteine, inhibited virus synthesis in the simple medium. A chemically defined mixture was found which supported a rate of virus synthesis very nearly comparable to that found for host cells in nutrient broth.

HUEBNER, R. J., JELLISON, W. L., & BECK, M. D. (1949.) **Q fever—A review of current knowledge.**—*Ann. intern. Med.* **30.** pp. 495–509. [Reprint.] **388**

This is a most useful review of a disease of man in which "it is the animal reservoir of the disease which is thought to be the immediate source of most human infections". The causal agent is *Rickettsia burneti* first recorded in Queensland, Australia, in 1937. Since 1945 the disease has been found on an increasing scale in U.S.A., Panama, Italy, Greece, Switzerland & Algeria [a recent report indicates that it may also be present in England, see *V. B.* **19.** 343]. *R. burneti* was found in the milk of cows from four or five widely separated dairies in the Los Angeles area [*V. B.* **19.** 342] and extension of these studies indicated that the milk of more than 60% of 63 dairies in that area contained the organism; about 10% of some 4,000 cows were infected. In the original Australian cases, human infection was particularly associated with employment in slaughterhouses and therefore suggested cattle as a possible source of infection. Although agglutinins against *R. burneti* were demonstrated in the blood of cattle, the organism was not recovered from them in Australia.

"Balkan Grippe" which occurred in German troops in Greece during the war has been shown by CAMINOPETROS (1948) to be caused by *R. burneti* [*V. B.* **19.** 603]. He has also found sheep and goats in Greece to be naturally infected and their milk to be infective for g. pigs.

In addition to man, cattle, sheep and goats the organism has also been recovered from bandicoots and from five species of ticks, namely, *Dermacentor andersoni*, *D. occidentalis*, *Amblyomma americanum*, *Haemaphysalis humerosa*, *Hyalomma savignyi*. There is little evidence that ticks are responsible for infection in man.

Cows excreting *R. burneti* in their milk had no symptoms of illness and attempts to recover the organism from their blood, urine and faeces were unsuccessful.

Artificially infected g. pigs had perivascular lymphocytic infiltration in various organs especially in the spleen and lymph nodes, the spleen was enlarged and the g. pigs had extensive pneumonia. Infection could be transmitted intraperitoneally and intranasally. A feature of the histology is the production of small granulomatous nodules 100μ to 500μ in diameter in the liver, spleen lymph nodes and bone marrow; in the nodules giant cell and spithelioid cells were commonly found.

The disease in man is characterized by sudden onset, fever, headache, sweating and pneumonitis. There is great variation in the severity of the illness. Sulphonamides and penicillin are without perceptible effect on the course of the disease, but streptomycin is said to be of value, as is aureomycin.—M. C.

COMBIESCO, D., COMBIESCO, C., DUMITRESCO, N., POPESCO, C., & ZARNEA, G. (1949.) Diagnostic rétrospectif par la réaction de fixation du com-

plément d'un foyer roumain de fièvre Q. **[Retrospective diagnosis of Q fever in Rumania by the complement-fixation reaction.]**—*Ann. Inst. Pasteur.* **76.** 81–82. [Abst. in *Trop. Dis. Bull.* **46.** 627. (1949), copied *verbatim.* Signed: JOHN W. D. MEGAW.] **389**

In March and April 1947, nine persons employed at the antirabic section of the Institute of Serology of Constanza, Rumania, were attacked by a fever which could not be diagnosed at the time. All the patients had been engaged two to three weeks before the onset, in one capacity or another, in shearing sheep which had come from the neighbouring area. Seven of the patients were attacked between March 28th and April 6th, the other two were attacked on April 11th and 23rd, respectively.

[The interest of the outbreak consists in its being the first to be recognized in Rumania, rather than in the retrospective diagnosis which was made by the complement-fixation test early in May of the same year.]

See also absts. **463** (Teschen disease); **500** (poliomyelitis); **536** (F. & M. disease); **537** (book).

IMMUNITY

WORMALL, A. (1948.) **Contributions of chemistry to the problems of immunology.**—*Brit. med. Bull.* **5.** 333–338. **390**

A review that deals briefly with chemical aspects of the mechanisms of immunity; the immunological specificity of antigens; chemically-altered and conjugated protein antigens; the antigenic mosaic of bacterial and other cells; blood group substances; antibodies; competitive inhibition in enzyme systems; hypersensitivity to simple compounds; and complement.

The review is not intended to be in any sense comprehensive, but it provides a useful selection of references to work in this important and rapidly developing field.—ALASTAIR N. WORDEN.

UNGAR, G., & MIST, S. H. (1949.) **Observations on the release of serum fibrinolysin by specific antigen, peptone, and certain polysaccharides.**—*J. exp. Med.* **90.** 39–51. [Authors' summary copied *verbatim.*] **391**

Formation of fibrinolysin from its inactive precursor in serum was observed under the following conditions: (a) by adding the specific antigen to serum from sensitized guinea pigs; (b) by mixing normal guinea pig serum with peptone, agar, hyaluronic acid, chondroitinsulfuric acid, glycogen, pneumococcal polysaccharides, and heparin. Activation of profibrinolysin by these agents differs from chloroform or streptokinase activation in that it requires the presence of some serum constituent non-precipitable with the euglobulin fraction and destroyed by heating at 56°C. The bearing of these observations on the mechanism of anaphylactic and anaphylactoid reactions is discussed. The findings reported support the concept that proteolysis is part of the process determining the release of histamine and other toxic products. It is suggested that the presence of fibrinokinase may be responsible for the toxicity of serum induced *in vitro* by a number of agents.

MANN, L. S., & WELKER, W. H. (1949.) **Toxemia as a stimulation factor in the production of antibodies. Studies on precipitin production in the dog. I. The use of egg white. II. The use of ricin.**—*J. Infect. Dis.* **85.** 146–149; 150–153. [Authors' conclusions copied *verbatim.*] **392**

I. The results of these experiments show that it is possible to call forth precipitins in blood serum of the dog, when the antigen is administered intramuscularly by the aluminum cream method and at the same time a condition of toxemia is induced by means of intravenous injection of egg white solution.

II. Precipitins for ox albumin can be produced in the dog following an intramuscular injection of ox albumin fixed on aluminum cream, concomitant with a single subcutaneous injection of 0·0005 mg per kg of ricin. The toxic state appears to be the potent factor in the production of precipitin antibodies in the dog rather than the toxin itself.

Dogs develop an immunity to ricin.

SOLOMON, D. H., GARDELLA, J. W., FANGER, H., DETHIER, F. M., & FERREBEE, J. W. (1949.) **Nephrotoxic nephritis in rats. Evidence for the glomerular origin of the kidney antigen.**—*J. exp. Med.* **90.** 267–272. [Authors' summary copied *verbatim.*] **393**

Nephrotoxic anti-rat kidney sera were produced in rabbits by intraperitoneal injection of suspensions of blood-free rat kidney. The nephrotoxin of these sera could be removed by adsorption with saline suspensions of finely ground rat glomeruli, but not by adsorption with other portions of rat kidney or by adsorption with several other rat tissues. It was concluded that nephrotoxic sera of this type react primarily with glomerular tissue and, by inference, that the antigen essential for the production of these anti-kidney sera was of glomerular origin. The observations are consistent with Pressman's demonstration that anti-mouse kidney sera labeled with radioiodine localize primarily in glomeruli.

HARTLEY, P., & HARTLEY, O. M. (1949.) **Factors affecting the response of immunised guineapigs**

to antigenic stimulus.—*Lancet.* **256.** 1003–1005. **394**

This report continues the investigations previously published by the authors [*V. B.* **14.** 56]. They had found that antibody production in g. pigs was but little affected by exposure to cold, restriction of diet, or intercurrent infection with *Clostridium welchii.* In these investigations the g. pigs were subjected to a more protracted restriction of diet, amounting to severe deficiency and their antibody production was studied. The antibody response was also studied in a group of g. pigs subjected to sublethal tetanus infection, and in a group which had received an intravenous injection of Indian ink.

After selecting 60 g. pigs in which the antibody response to injections of alum-precipitated diphtheria toxoid was satisfactory, they were divided into four groups. Thirteen control animals were on full diet (15 g. bran, 15 g. sugar-beet pulp residue, 50 g. cabbage daily, and supplies of hay). The diet was restricted in 13 animals for 21 days before the injection of the antigen. For 24 hours they received water, but no food; for the next nine days 15 g. each of bran and sugar-beet pulp were allowed; subsequently hay was added, but no cabbage or fresh green food. A group of 12 normally fed animals were injected with tetanus toxin before the experimental antigen was administered; the dose was adjusted to produce moderate symptoms, and all the animals recovered. A group of 12 animals received Indian ink (0·4–0·5 ml.) intravenously on the morning of the injection of the antigen.

These four groups of animals received one flocculating unit of alum precipitated toxoid in 1 ml. of saline. Two days before and ten days after this injection the serum antitoxin level was determined in each animal. In the groups subjected to sublethal tetanus and Indian ink injections there was a rise in antitoxin level similar to that in the control group; the ability of these groups to produce antitoxin was, therefore, not impaired. Nine of the animals on restricted diet were found to be moribund on the fourth day after the injection of antigen, and five died despite dietary supplement to all animals of this group at this stage. In the remaining animals there was, in general, a slight but significantly lower increase in the serum antitoxin level on the tenth day than that in the controls. It was concluded that in animals successfully immunized, mild or temporary restriction of diet will not seriously affect the secondary immune response, but that prolonged and severe dietary restriction greatly diminishes antibody production.—G. Fulton Roberts.

Ouchterlony, Ö. (1949.) **Antigen-antibody reactions in gels.**—*Acta path. microbiol. scand.* **26.** 507–515. [In English. Author's summary slightly modified.] **395**

Certain types of antigen-antibody reactions, e.g. between diphtheria toxin and antitoxin, may be made visible by allowing the substances to diffuse towards each other in a suitable gel, such as agar. Depending on such factors as combining proportions, concentration and diffusion velocity of the two components, streak- or band-like precipitates appear when the diffusion in the gel is suitably arranged. Combined with absorption methods, the diffusion method with interference and cross reactions allows qualitative antigen-antibody analyses. Quantitative classifications, within certain limits, are also feasible.

Bernstein, T. B., & Feinberg, S. M. (1949.) **Histamine antagonists. XIV. An experimental and clinical study of N,N-dimethyl-N′-2-thiazolyl - N′ - p - methoxybenzyl - ethylenediamine hydrochloride (194-B).**—*J. Lab. clin. Med.* **34.** 1007–1009. [Authors' summary copied *verbatim.*] **396**

The laboratory experience and clinical results produced by another recently synthesized antihistaminic agent, N,N-dimethyl-N′-2-thiazolyl-N′-p-methoxybenzyl-ethylenediamine hydrochloride (194-B), are reported. This compound was found to have potent antihistaminic and anti-anaphylactic properties as determined by various experimental methods. Its clinical use was attended with favorable symptomatic relief in seasonal hay fever, but negligible improvement in asthma. Toxic side reactions were few in incidence and mild in degree.

Rice, C. E. (1949.) **"Nonspecific" complement-fixing activity of cloudy avian sera. I. Preliminary observations.**—*Canad. J. comp. Med.* **13.** 192–197. **397**

Crowson, C. N. (1949.) **"Nonspecific" complement-fixing activity of cloudy avian sera. II. Preliminary chemical studies of turkey and chicken sera.**—*Ibid.* 197–204. **398**

I. The cloudiness which causes trouble at times in the agglutination test is also a factor to be considered in the "indirect" complement-fixation test. In such sera there may be fixation of complement with *Salmonella pullorum* and other antigens. This may be avoided by using recently prepared antigens of low anticomplementary titre, and by the diluting cloudy sera with clear sera from normal birds, preferably of the same species.

II. Definitely cloudy sera had a higher non-saponifiable lipoid and total fat content than slightly opalescent turkey sera. It was suggested from these findings that the lipoid phosphorus, or another factor that had been increasing parallel with it, was fundamentally related to "non-

specific" complement-fixing properties. There was no relationship between variations in total protein content and cloudiness or "nonspecific" complement-fixing activities.—R. GWATKIN.

I. YOUNG, L. E., ERVIN, D. M., CHRISTIAN, R. M., & DAVIS, R. W. (1949.) **Hemolytic disease in newborn dogs following isoimmunization of the dam by transfusions.**—*Science.* **109.** 630–631. **399**

II. CHRISTIAN, R. M., ERVIN, D. M., SWISHER, S. N., O'BRIEN, W. A., & YOUNG, L. E. (1949.) **Hemolytic anemia in newborn dogs due to absorption of isoantibody from breast milk during the first day of life.**—*Ibid.* **110.** 443. [Only abst. given, slightly amended.] **400**

I. Of the four known iso-haemagglutinins which may be produced by blood transfusion between dogs, that most readily provoked is called "anti-Do". A bitch, the red cells of which did not contain the Do factor was immunized by transfusion of Do-positive cells and subsequently mated with a Do-positive male. Of the litter of eight puppies, four were Do-negative and were normal clinically and serologically. The remaining four were Do-positive and were considered to have signs of haemolytic disease of the new-born; two of them were anaemic (one with jaundice) and the other two thrived less well than their Do-negative litter mates.

All four Do-positive puppies yielded a positive Coombs' test using a rabbit anti-dog-globulin serum. The Do-negative puppies had the maternal antibody in their plasma (proved by agglutination of the sire's cells) but the Do-positive puppies had no iso-haemagglutinin in the plasma, presumably because it was bound to the cells. Elution experiments on these cells failed.

The antibody was demonstrated in the dam's milk; the puppies had all been suckled for two hours before the first blood samples were taken. The antibody had disappeared from the plasma of the Do-negative puppies by the ninth day, and from the cells of the Do-positive puppies by the 12th day. A severely affected puppy and a normal litter mate were killed on the third day for histological study. Erythroblastosis and extra-medullary erythropoiesis were seen in the affected puppy, but no evidence of kernicterus.

—G. FULTON ROBERTS.

II. Four different antigenic factors have thus far been identified serologically in dog erythrocytes. One of these which may conveniently be called the "Do factor" appears to be somewhat analogous to the Rh factor of human red blood cells. Dogs lacking this factor in their red corpuscles are accordingly labeled "Do-negative" and those whose cells contain this factor are called "Do-positive".

Do-negative bitches that have been immunized by transfusions of Do-positive blood develop Do-antibodies that appear in high concentration in the colostrum after pregnancy and persist for several weeks in the breast milk. Experience with nine litters has shown that Do-positive puppies regularly develop hemolytic anemia if they are suckled by such an immunized dam during the first day or two of life. The lack of antibody absorption from milk after the second day has not yet been explained. There is evidence that natural immunization of the dam by fetal red cell factors may occur during pregnancy, thus producing hemolytic disease in dogs similar to that recently discovered as a naturally occurring phenomenon in horses.

BRILES, W. E. (1948.) **Induced haemolytic disease in chicks.**—*Genetics.* **33.** 96–97. **401**

Chicks, developing symptoms of haemolytic disease, have been hatched from eggs laid by a hen which had been immunized with blood containing at least one antigen in addition to that of the sire. By the fifth day after hatching five out of seven chicks were anaemic and jaundiced and only one of those affected survived. As the symptoms developed, examination of the cells of the affected chicks revealed the presence of D^2 antigen [see BRILES *et al.* (1948)].

The two healthy chicks did not develop this antigen. The yolks of eggs laid by the dam subsequent to the hatching of the above chicks, contained antibodies reacting strongly with the cells of the recovered chick and of the sire, but only weakly with those of the two unaffected chicks.

Two factors thus seem to be responsible for the onset of the disease: the development of D^2 antigen and the assimilation of the yolk.

—J. G. O'SULLIVAN.

ANDERSON, J. A., & BOLIN, V. (1949.) **Congenital antiviral immunity in Swiss mice.**—*Amer. J. Hyg.* **50.** 200–206. [Authors' summary copied *verbatim.*] **402**

White Swiss-W (Webster) mice vaccinated with sublethal doses of virulent M.M. [mouse encephalomyelitis] virus are able to confer a congenital immunity to their offspring. This congenital immunity appears to be of a passive nature and probably persists at least 6 to 7 weeks after weaning, at which time it begins to wane. Congenitally immune offspring that survive large daily oral doses of the M.M. virus appear to develop a more lasting immunity of a higher degree. It is suggested that the daily oral ingestion of live M.M. virus during the decline of a congenital passive immunity serves to enhance this immunity and probably converts it into one of an active nature.

BATSON, H. C. (1949.) **The relative significance of graded immunizing and challenge doses in measuring the potency of vaccines. A study of mouse protection by typhoid vaccine.**—*J. exp. Med.* **90.** 233–253. [Author's summary copied *verbatim.*] **403**

A study of the effect of graded immunizing doses of typhoid vaccine and graded challenge doses of *S. typhosa* in 5 per cent mucin on the degree of gradation of response (survival or death) elicited in successive groups of mice is reported. In the range of doses employed the effect of graded immunizing doses was markedly greater than was the effect of graded challenge doses. Statistically the difference exceeded the 0·1 per cent level of significance.

It was concluded that the use of graded immunizing doses was preferable to the use of graded challenge doses as a basis for the immunological assay of typhoid vaccine, since with the former there was obtained (a) a greater significance of differences in response of groups given graded doses even with smaller fold increments in successive doses, (b) a greater slope of the dosage-response curve which permitted estimation of ED_{50} values with smaller standard errors, and (c) an effect on response apparently less dependent on the sex of mice used.

See also absts. **271** (agglutogenic streptocci); **274** (killed anthrax vaccine); **282** (BCG); **292** (complement fixation in glanders); **295** (serological relationships of *Pseudomonas* strains); **297** (paracolon group); **302** (fowl typhoid); **305** (brucellosis); **315** (fungous antigens); **319** (leptospirosis); **330-331** (dourine); **335-336** (tridiomoniasis); **349** (mixed F. & M. and cow-pox vaccine); **366** (equine infectious anaemia); **370-373** (rinderpest goat virus vaccine); **382-384** (Newcastle disease); **389** (Q fever).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

EDDY, G. W., & CARSON, N. B. (1948.) **Organic compounds tested against body louse eggs.**—*J. econ. Ent.* **41.** 31–36. [Authors' summary copied *verbatim.*] **404**

From 1942 through 1945 several thousand compounds were tested against the eggs (nits) of the body louse, *Pediculus humanus corporis* Deg. Most of the tests were made by dipping small pieces of cloth bearing 100 to 200 or more 4- to 6-day-old eggs into alcoholic solutions of the test materials, allowing the eggs to dry in the open air for about an hour, and then incubating at 30°C. The relative humidity was held at approximately 85 per cent.

This paper lists the materials that caused complete mortality (100 per cent) of eggs when used at a strength of 1 per cent or less. Of the 312 materials listed, 215 were not lethal at 0·5 per cent. Complete mortality was obtained with 20 compounds at 0·25 per cent, but only 2 of these, chloromethyl *p*-chlorophenyl sulfone and sebaconitrile, proved completely lethal to eggs at 0·1 per cent.

The 20 compounds that caused complete mortality as 0·25 per cent alcoholic solutions were also tested as powders in pyrophyllite [the mineral $Al_2O_3 \cdot 4SiO_2 \cdot H_2O$.—Ed. *V. B.*]. All the materials proved far less effective in pyrophyllite than in alcohol.

ROMAÑA, C., & ABALOS, J. (1947.) *Triatoma delpontei* **n. sp. (Hemiptera, Reduviidae).**—*An. Inst. Med. reg.* **2.** 79–93. [English and French summaries.] [Abst. in *Rev. appl. Ent.* Ser. B. **37.** 178. (1949), copied *verbatim.*] **405**

Descriptions are given of all stages of *Triatoma delpontei*, sp.n., adults of which were found in the nests of a bird (*Myiopsitta*) in several Provinces of Argentina in 1943–45, together with characters distinguishing it from *T. platensis*, Neiva. One batch was found to be infected by *Trypanosoma* (*Schizotrypanum*) *cruzi.* The bug was reared in the laboratory on pigeon and guinea-pig, and has been successfully used in xenodiagnosis of *T. cruzi.*

FRAENKEL, G., & RUDALL, K. M. (1947.) **The structure of insect cuticles.**—*Proc. roy. Soc.* Ser. B. **134.** 111–143. [Authors' summary copied *verbatim.*] **406**

The amount of chitin and of protein in the blowfly larval cuticle remains essentially unchanged during the process of hardening and darkening of the puparium. In the formation of the puparium there is a gain of weight of about 6% over the larval cuticle weight, and this can be accounted for by the incorporation of phenolic substances. These are derived from the free tyrosine in the blood which decreases by an amount sufficient to account for the weight increase of the cuticle. An insoluble and highly resistant fraction has been isolated from the puparium, and this consists of about equal quantities of protein and pigment and possibly represents the natural association of these two substances in parts of the puparium. All the evidence suggests that the tyrosine is deaminated before giving the derivatives which combine with the cuticle substance, hardening and darkening it.

Further properties of arthropodin, the water-soluble protein of soft arthropodal cuticles, are described. X-ray and related studies give a picture of polysaccharide protein complex in the cuticle which implies a model with alternating monolayers of protein and chitin. This appears to be based on a ratio of 8 amino acid residues to 1 chitobiose residue, or for equal lengths of protein and chitin chains a weight ratio of 45 : 55. This basic weight-ratio of protein and chitin

appears to occur in the soft cuticles of blowfly larvae and other arthropods.

A review is given of the composition and properties of various cuticles, and it is evident that hardening may be achieved without darkening of the cuticle. The chemical basis of this type of cuticle stabilization merits further study.

DENNELL, R. (1947.) **A study of an insect cuticle: the formation of the puparium of** *Sarcophaga falculata*. **Pand. (Diptera).**—*Proc. roy. Soc.* Ser. B. **134.** 79–110. [Author's summary slightly modified.] **407**

The structural and chemical changes taking place in the cuticle of the mature larva of *Sarcophaga* as it is converted into the puparium are fully described. The formation of the hard and dark exocuticle of the puparium from the outer endocuticle of the larva is due, as Pryor (1940) has shown, to the action of a phenol derived from the blood, a polyphenol oxidase located in the inner epicuticle and present considerably before pupation being responsible for the rapid oxidation of the phenol. The blood phenol, although spontaneously oxidizable, passes unchanged through the inner endocuticle which remains soft and white, and this may be correlated with the ability of the inner endocuticle to reduce methylene blue.

The phenol which hardens the puparium is produced in the blood by the enzymatic oxidation of tyrosine. Tyrosine in the blood increases steadily in amount before pupation, and during this period the enzyme tyrosinase also appears and increases. The source of tyrosinase appears to lie in the oenocytoids of the blood, which increase in number as the larva matures and die away shortly before pupation. But although tyrosine and tyrosinase are present together in the blood of the mature larva, inhibiting conditions prevent the activity of the enzyme until very shortly before pupation. Tyrosinase activity, however, may be experimentally stimulated before pupation by the action of methyl alcohol and more slowly by narcotics, and it is speculated that the inhibition of tyrosinase in the mature larva may perhaps be effected by the activity of a further enzyme, a dehydrogenase, which operates by increasing the reducing power of the blood.

Colorimetric and potentiometric studies of the reducing power of the blood have been carried out, and it has been found that the oxidation-reduction potential of the blood decreases steadily as the larva matures, and then rises sharply just before pupation. The coincidence of this rise with the period of liberation of the pupation hormone suggests that one function of the hormone is to destroy the reducing power of the blood, so liberating tyrosinase activity and leading to the production of a polyphenol which passes into and hardens the cuticle.

In conclusion, it is suggested that the homology between the insect and crustacean cuticles is closer than has been hitherto emphasized.

SCHMITZ, W. R., & GOETTE, M. B. (1948.) **Penetration of DDT.**—*Soap & Sanit. Chem.* **24.** 118–121. **408**

To obtain the best residual effectiveness of a contact insecticide the material must remain available for contact with insects. When an emulsion or solution is applied to a porous surface, the solvent penetrates into the structure and carries some of the insecticide with it. This portion of the insecticide crystallizes below the surface and is biologically unavailable.

In a series of experiments upon the penetration of D.D.T. solutions and emulsions into wood it was found that the physical properties of the wood had little influence upon penetration. In all the tests the more volatile group of solvents gave least penetration and greatest surface deposition of D.D.T. Of the solvents tested a xylene emulsion gave the best surface deposit.

—W. MOORE.

FRYER, H. C., ATKESON, F. W., & SMITH, R. C. (1948.) **Comparison of methods for testing repellent-type fly sprays.**—*J. econ. Ent.* **41.** 80–88. **409**

The authors critically compared the "whole cow" and "half cow" techniques for testing repellent fly sprays. When the "half cow" method was used the repellent spray on one side of the cow interfered with the fly counts for a second spray on the opposite side and when toxicant sprays were tested the effectiveness of one toxicant accrued to the benefit of both, so that the results on analysis led to impossible conclusions.

The "whole cow" method is more satisfactory. Groups of three or more cows of similar susceptibility to flies are separated from other groups for the period of the tests and a 7 × 7 latin square design is used to indicate how the sprays are to be rotated from one group to another. Two hours after spraying, counts of the number of flies on each cow in each group are made, the counts being repeated at appropriate intervals through the day: 1,260 counts were made during each of the two 21-day series of tests using the "whole cow" technique. The fly counts then need to be transformed mathematically into measurements of repellency which approximately conform to the normal frequency distribution. Statistical analyses are derived from the formula $Y = \log_e (X + 1)$ where X is the number of flies and Y the measurement of fly repellency and the t-test and F-test

techniques are available for analysis of the data.

With D.D.T. and chlordane similar techniques may be used when information on the minimal dosage and residual effects are required.

—M. J. LETHBRIDGE.

SNIPES, B. T., COOPER, R. S., & CLARK, S. W. (1948.) **Comparative effectiveness of variations in spray pressure, rotenone concentration, sulfur content, diluents and application methods in cattle grub control.**—*J. econ. Ent.* **41.** 635–642. [Authors' summary and conclusions copied *verbatim.*] **410**

Comparative tests were conducted in Wyoming in March of 1944 to obtain an indication of possible differences in grub control effectiveness attributable to method of application, power spraying pressure, rotenone concentration, wettable sulfur content and type of dust diluent. Two hundred and thirty Hereford yearlings were treated and extractions were made at an interval of 14 days from 5 representative animals in each experimental lot. Twenty-one different applications were involved, with extractions of 1417 dead and live grubs from 121 treated animals.

Results of these tests are considered as preliminary and indicative, while conclusions allowable pertain to the conditions and conduct of this experiment. All instars of both *Hypoderma lineatum* (DeVillers) and *H. bovis* (DeGeer) were represented in the backs of test animals, but there was no apparent difference in grub survival or mortality correlated with species or stage of larval development. When a standard spray suspension was used at 2 quarts per head, grub kills increased with an increase in power spray pressure. A total mortality of 97·5 per cent of all species and instars was obtained at a pump gauge pressure of 400 pounds. With a constant wettable sulfur content of 10 pounds per 100 gallons and a pump pressure of 400 pounds, grub mortalities were increased with an increase in rotenone content of the spray. A suspension containing 0·031 per cent rotenone (97·5 per cent kill) was significantly more effective than one with a concentration of 0·024 per cent (75·6 per cent mortality). Application of the 0·031 per cent rotenone suspension without wettable sulfur resulted in a reduction of 18 per cent in control effectiveness. Rotenone-wettable sulfur suspensions of a given concentration were more effective as power sprays at 2 quarts per head than as hand washes scrubbed into the back at a dosage of 1 pint. Dusts for hand treatment at 3 ounces per animal were less effective against cattle grubs than were power sprays, under the conditions of these tests. Dusts containing 1 per cent rotenone resulted in approximately 50 per cent mortality, while 1·25 per cent combinations gave slightly higher mortalities. There was no apparent significant difference between dusting sulfur, wettable sulfur, pyrophyllite and double ground Tripoli earth as dust diluents for hand treatment, although the latter carrier gave some increase in total mortality.

For convenient and efficient treatment of medium or large herds of range or feeder cattle, proper power spraying at a minimum pump pressure of 400 pounds, at an approximate dosage of 2 quarts per head of a suspension composed of 5 pounds 5 per cent rotenone powder with 10 pounds wettable sulfur per 100 gallons of water, represents an economical, rapid and effective method of application which can be expected to kill well in excess of 90 per cent of all grubs accessible in the back at the time of treatment.

BARRETT, W. L., & WELLS, R. W. (1948.) **Transplantation of *Hypoderma* larvae and testing chemicals for control of larvae in experimental hosts.**—*J. econ. Ent.* **41.** 779–782. [Authors' summary copied *verbatim.*] **411**

In preliminary laboratory tests conducted at Dallas, Tex., it was found that the difficulties encountered in the eradication of cattle grubs *Hypoderma lineatum* (De Vill.) and *H. bovis* (Deg.), could be satisfactorily overcome by the use of a chemotherapeutic agent, with a selective toxicity, that would destroy larvae within the host by one treatment. Goats, rabbits, and white mice were tested as possible experimental host animals for transplanted cattle grubs, first-instar, taken from the gullets of commercially slaughtered cattle. As many as 20 per cent of the larvae were recovered in some of the goats at necropsy. Some larvae survived in the goats for 4 months.

In rabbits as many as 85 per cent of the larvae were recovered 26 days after they had been transplanted. Rabbits are preferred as experimental hosts because of their size, but are more expensive than mice. Transplanted larvae in mice remained in connective tissue for more than a week, but there was considerable mortality of larvae during the third and fourth weeks. Mice are especially useful for testing rare and costly chemicals as chemotherapeutic agents because of their small size.

Approximately 200 chemicals were tested on first-instar *Hypoderma* larvae *in vitro* in blood serum, and numerous substances were tested in grub-infested mice. Eosine Y reached and stained the larvae in loose connective tissue. It is doubtful that the results from tests *in vitro* are reliable indices of the possible chemotherapeutic action of a compound *in vivo*. Sources of larvae and methods of collecting, handling, and transplanting the larvae are given.

RUBTZOV, I. A. (1948.) **[A new palearctic**

species of cavity botfly (*Diptera*, **Oestridae**).]—*Ent. Obozr.* **30.** 138–142. [Abst. in *Rev. appl. Ent.* Ser. B. **37.** 148. (1949), copied *verbatim.*] **412**

Collections of *Rhinoestrus purpureus*, Brauer, an Oestrid that attacks horses, at the Zoological Institute in Leningrad were found to include some examples here described as *R. latifrons*, sp.n. The dates of capture on the labels suggested that *R. latifrons* is on the wing from early May to the end of August. The examples were taken between 1890 and 1933 chiefly in Mongolia and Kazakstan, with one from the Province of Chkalov, south of the Ural mountains. E. I. Gan recorded this species from the Province of Samarkand, Uzbekistan, in 1947, and stated that third-instar larvae were observed in the pharynx of horses. The possible origin of these two species and of *R. uzbekistanus*, Gan (1947), which attacks horses and donkeys in Uzbekistan, is discussed.

McGregor, W. S. (1949.) **Field tests of insecticides and spraying methods to control horn flies in dairy herds.**—*J. econ. Ent.* **42.** 641–643. [Author's summary copied *verbatim.*] **413**

During the summer of 1948 experiments were conducted for the control of horn flies, *Siphona irritans* (L.), on dairy herds in the vicinity of Kerrville, Texas. Four chlorinated hydrocarbon insecticides—DDT, methoxychlor, dichlorodiphenyl dichloroethane and toxaphene—were compared. Each insecticide was applied as a 0·5 per cent emulsion to four herds of grade Jersey cows as follows: (1) 2 quarts of spray over the entire body, (2) 1 quart of spray over the entire body, (3) 1 quart over the dorsal half of the body (top line), and (4) 1 quart over the ventral half of the body (under line).

Drought conditions unfavourable for horn fly increase caused considerable variation in the results. However, records made during periods of favourable weather were in accord with those obtained by other workers of the Kerrville laboratory during the 1947 horn fly season.

The performances of the four insecticides were similar. The protective values were about equal, whether 1 or 2 quarts of the insecticide were applied over the entire body or 1 quart over the dorsal half of the cow's body. When herds were sprayed on the under line only, fly-free periods were diminished.

Wilkinson, P. R. (1948.) **Tests of insecticides on cattle.**—*E. Afr. agric. J.* **14.** 12–17. **414**

The possibilities of controlling tsetse fly in Uganda by the treatment of cattle with various insecticides were investigated. The preparations were sprayed on to calves in covered fly-proof stalls or tethered in a fenced enclosure, according to the weather. After various intervals, specimens of *Glossina palpalis fuscipes* were exposed to the sprayed areas on the skin of the calves. D.D.T. emulsions were found to be superior to D.D.T. in powder form and to gammexane.—B. A. T.

Howell, D. E., Eddy, G. W., & Cuff, R. L. (1949.) **Effect on horse fly populations of aerial spray applications to wooded areas.**—*J. econ. Ent.* **42.** 644–646. [Authors' summary copied *verbatim.*] **415**

The effect on horse fly populations of aerial sprays applied to wooded areas was studied. Ten-acre plots were treated with 2 pounds per acre of one of the following insecticides, dispersed in a mixture of cyclohexanone and No. 1 fuel oil: methoxychlor, DDT, toxaphene, and chlordan. The effectiveness of the materials was determined by counting flies attacking draft horses led through the test plots 1 day before spraying and 1, 2, 3, 5, and 7 days after treatment.

The results appeared somewhat erratic, and no appreciable effect on fly populations could be demonstrated for any of the insecticides tried.

Tabanus abactor and *T. sulcifrons* were the two most abundant species. *T. atratus*, *T. vittiger*, *T. mularis*, and *T. venustus* were present in small numbers. A few species of *Chrysops* and *Silvius* were also present.

Graham, N. P. H., & Scott, M. T. (1948.) **Observations on the control of some ectoparasites of sheep. 1. The use of arsenic, rotenone, sulphur, and phenol compounds for the control of the sheep ked** (*Melophagus ovinus*) **and the sheep body louse** (*Damalinia ovis*).—*J. Coun. sci. industr. Res. Aust.* **21.** 252–265. **416**

Using the four insecticides which, until recently, were the commonest ingredients of sheep dips, extensive laboratory and field trials were carried out to assess their efficiency for the control of keds and lice. Arsenic as As_2O_3 in a 0·2% solution was toxic *in vitro* to adult keds and to pupae only if the latter were under 24 hours old. Field dipping in arsenical solutions proved to be inefficient; some keds and most pupae survived, there being no residual toxicity left in the fleece. Sodium arsenite was found to be effective at a concentration of 0·1% As_2O_3 for the control of body lice, killing motile forms and remaining on the skin long enough to kill nymphs which hatched after dipping. Rotenone in the form of an ether extract of derris root dissolved in acetone and as ground Timbo [name given to a Brazilian plant, *Serjania curassavica*] root suspended in water was quite effective for adult keds, but not for pupae or body lice, residual toxicity not being sufficiently persistent to prevent re-infestation from remaining

pupae. Sulphur in concentrations of 1% had little effect on the ked population. An emulsion of 0·49% phenols killed adult keds but not pupae and left no residual toxicity. Dipping as soon as possible after shearing is also recommended, when the greatest efficiency of the dip is observed, advantage being taken of the less suitable environment for survival of the parasites, and of the more efficient wetting by the dip.—B. A. FORSYTH.

McTIER, L. A. W. (1948.) **Trombidiosis in sheep in New South Wales.**—*Yearb. Inst. Insp. Stk N.S.W.* 1948. pp. 71–72. **417**

This is a note recording the infestation of two flocks with *Trombicula sarcina*. Infestation with this parasite had previously been recorded in Queensland and in New South Wales.
—D. F. STEWART.

See also absts. **329** and **534** (tsetse fly); **374** (mosquitoes); **538-539** (books).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

OLSEN, O. W. (1949.) **White-tailed deer as a reservoir host of the large American liver fluke.** —*Vet. Med.* **44.** 26–30. **418**

A review of published literature suggests that *Fasciola hepatica* is extremely rare in North American deer, but that *Fascioloides magna* is the prevalent species. Thirty-six of 52 deer livers collected in Refugio County, Texas, were infected with *F. magna*, but no specimens of *F. hepatica* were found in spite of the fact that this species was common in cattle from the same area. Although *F. magna* readily infects cattle it is unable to complete its life cycle. In sheep and goats the life cycle may be completed, but the host is often killed by the parasite. Five species of snails—*Stagnicola palustris nuttalliana*, *S. bulimoides techella*, *Fossaria parva*, *F. modicella rustica* and *Pseudosuccinea columella* are known to serve as hosts of *F. magna* and it is possible that *S. bulimoides bulimoides* may be an efficient host.
—S. BRIAN KENDALL.

KREIS, H. A. (1947–48.) I. Eine systematische Bemerkung zur Arbeit: H. Vogel und W. Minning: Ueber die Einwirkung von Brechweinstein, Fuadin und Emetin auf Bilharzia japonica und deren Eier im Kaninchenversuch. **[Comment on the paper by Vogel and Minning on "The action in rabbits of tartar emetic, fouadin and emetine on *Schistosoma japonicum* and its eggs."]** II. Bilharzia oder Schistosoma? Ergänzende Mitteilung zur Bemerkung H. A. Kreis in *Acta tropica.* **4.** 259–260. 1947. [*Bilharzia* **or** *Schistosoma?* **Further communication.**]—*Acta tropica.* **4.** 259–260; & **5.** 87–88. [Abst. in *Trop. Dis. Bull.* **45.** 617, slightly modified.] **419**

I. This is a comment on the paper by VOGEL and MINNING (1948) and the author does not criticize the work which he says is of much interest, but he objects to the name of the trematode. He traces historically the changes in the naming of this worm. Bilharz describing it in 1852 called it *Distomum haematobium.* Six years later, Weinland stated that it did not belong to this genus *Distomum* and put it under a new genus *Schistosoma*, and *Schistosoma haematobium* (Bilharz, 1852) became *S. haematobium* Weinland, 1858. But in the same year, Diesing gave it the generic name of *Gynaecophorus* and in 1859 Cobbold, in honour of its discoverer, called it *Bilharzia* and the same year Moquin-Tandon called the new genus *Thecosoma.* The author argues that as Weinland was the first to show that it did not belong to the genus *Distomum*, according to the laws of nomenclature its correct name is *Schistosoma.* VOGEL and MINNING, however, called the helminth they were dealing with *Bilharzia japonica* on the ground that Meckel used the term *Bilharzia* in 1856, or two years before Weinland created the genus *Schistosoma.* LEUCKART in his work on *Die Parasiten des Menschen* calls the urinary schistosome "*Bilharzia* Cobbold, 1859" which is certainly wrong if Meckel had called it so three years before. So far, all seems plain sailing, but prolonged search has failed to find where Meckel called it *Bilharzia*, and the works of Lutz, of Faust, of Worth, Martin, Hunter and others say nothing about Meckel. Therefore, until proof is obtained that Meckel *did* make the genus *Bilharzia* in 1856, the name of *Schistosoma* Weinland, 1858 must hold good.

II. In his supplementary note Kreis dwells on the fact that in the account of SENN's booklet on Theodor Bilharz, Professor Leiper speaks of a posthumous work "Mikrogeologie" by Meckel von Hemsbach, published in 1856, in which the generic name *Bilharzia* is used. Meckel as the originator of the name *Bilharzia* is also mentioned in a book on *Famous Tropical Physicians* by G. OLPP, published in Munich in 1932. In Professor Leiper's words: "Those who regretted the displacement of the generic name *Bilharzia* Cobbold, 1859 by *Schistosoma* Weinland, 1858 under the Law of Priority will rejoice in the restoration of *Bilharzia* Meckel, 1856 under the same Law." In spite of, or in comment on, this, E. W. PRICE (*J. Parasit.* (1933–34.) **20.** 111) wrote: "but in this case priority is of little moment in view of the fact that in 1922 *Schistosoma* was placed on the list of official names under Opinion 77 of the Inter-

national Commission on Zoological Nomenclature." To end the dilemma, Dr. Kreis in 1938 asked the Commission for a decision and he received a reply from the President saying that he would bring the request to the notice of the members; he suggested that in the meantime as *Bilharzia* could obviously claim priority, this name should be used and provisionally *Schistosoma* should be inserted in brackets. Dr. Kreis says that he repeated his request in 1947, but, so far as he knows, no decision has yet been made. He adds naively, "When the decision is reached, it will be authoritative."

AUGUSTINE, D. L., & WELLER, T. H. (1949.) **Experimental studies on the specificity of skin tests for the diagnosis of schistosomiasis.**—*J. Parasit.* **35.** 461–466. [Authors' summary and conclusions copied *verbatim.*] **420**

Rabbits were repeatedly exposed to three species of non-human schistosome cercariae, *C. stagnicolae*, *C. physellae*, and *C. elvae*, with the production, after the first exposure, of an extensive dermatitis. Approximately seven weeks after the last exposure, intradermal tests were performed on the 5 experimental and 2 control rabbits, using antigens made from the 3 non-human schistosome cercariae, two different antigens prepared from cercariae of *Schistosoma mansoni*, and an antigen made from cercariae of a strigeid, *D. flexicaudum*. Essentially negative reactions were obtained with the two *Schistosoma mansoni* antigens when employed in high dilutions. The results obtained with the other antigens were equivocal.

An effective method for the concentration of living dermatitis-producing schistosome cercariae was developed by utilizing the positive phototropic and negative geotropic reactions of the cercariae.

KUITUNEN-EKBAUM, E. (1949.) **A case of *Dipylidium caninum* in a child.**—*Canad. J. publ. Hlth.* **40.** 115–116. **421**

The case report was published to draw attention to the fact that human *D. caninum* infection has been encountered in Canada. The patient, a three-year-old child, frequently passed one or two proglottids in her stool. The case is briefly described. In most cases the human infections are slight.—R. GWATKIN.

BRIZARD, A., & EUZÉBY, J. (1949.) Un cas de dermatose vermineuse du chien. **[Verminous dermatitis in a dog.]**—*Rev. Méd. vét., Lyon et Toulouse.* **100.** 82–86. **422**

The authors report a case of verminous dermatitis in an eight-month-old English setter, caused by the larvae of *Rhabditis strongyloides*. It disappeared when the damp litter on which the animal was sleeping was replaced by dry straw. A five-year-old companion dog was not affected.
—M. J. LETHBRIDGE.

THORBORG, N. B., TULINIUS, S., & ROTH, H. (1948.) Trikinose paa Grönland. **[Trichinosis in Greenland.]**—*Ugeskr. Laeg.* **110.** 595–602. [Copied *verbatim* from abst. in *Bull. Hyg., Lond.* **23.** 687. (1948), signed: CLAUDE LILLINGSTON.] **423**

In May, 1947, the State Serum Institute in Copenhagen received an appeal for help from Greenland where an epidemic, of unknown character, had broken out. Thorborg was sent out in the same month to investigate. From the beginning of January until the middle of May there had been some 300 cases, 33 of which had ended in death.

Trichiniasis was suspected on the clinical evidence and the observation that there seemed to be no infection of one patient by another. This diagnosis was confirmed by the demonstration of eosinophilia (more than 4 per cent. eosinophile leucocytes), by cutaneous tests with a *Trichinella* antigen, by serological tests of samples sent to Denmark, and by the demonstration of encapsuled *Trichinella* larvae in the muscles of a patient who had died after 3 months' illness. Pork could not be blamed, and there were many patients who had not recently eaten dog, which is considered a delicacy in Greenland. Several other possible sources of infection could be eliminated completely or partially, and the most probable offenders were the walrus, dog and possibly the white whale (*Delphinapterus leukas*). No case of trichiniasis has hitherto been reported from Greenland.

SKELLER, E. (1948.) Trichinose i Kutdligssat. **[Trichinosis in Kutdligssat, Greenland.]**—*Ugeskr. Laeg.* **110.** 602–607. [Abst. from abst. in *Bull. Hyg., Lond.* **23.** 687. (1948), signed: CLAUDE LILLINGSTON.] **424**

In the spring of 1947 an epidemic broke out in a coalmining district of Greenland, most of the 930 inhabitants of which depended on coal for their livelihood. The diagnosis of trichiniasis was confirmed by serological tests and the demonstration of the parasite in the muscles at P.M. examination. Walrus meat was suspected, although not definitely incriminated.

OTTO, G. F. (1949.) **Heartworm in dogs.**—*N. Amer. Vet.* **30.** 181–189. **425**

The author discusses problems in the epidemiology and control of *Dirofilaria immitis* infestation in dogs. In the U.S.A. serious clinical cases are confined largely to the Atlantic seaboard. Quantitative data are scanty, but it is probable that 50 or more nematodes are sufficient to produce clinical symptoms; and the frequency of the syndrome (characteristic cough, cardiac decom-

pensation, collapse on exercise, and ascites) is evidence of the high incidence of serious cases in the above area. Sub-clinical cases may persist up to two and a half years after infection. Although various mosquitoes and the dog flea are believed to be vectors of *D. immitis*, since development to what appears to be the infective stage has been observed in them, there is no conclusive evidence on this point. It is suggested that transmission by mosquitoes breeding in brackish water may account for the high incidence near the coast. Large-scale control in enzootic areas by chemotherapy of established infestations or elimination of the arthropod vectors is not considered practicable.

The normal site for the adult appears to be the right ventricle, but dead nematodes may be swept into the pulmonary artery. The clinical manifestations can all be explained on a basis of mechanical interference with heart function and blood flow to the lungs, but this does not preclude the possibility of toxic effects from metabolic products of the worms. Ascites may result from chronic passive congestion caused by disturbed function of the heart, and should, at least in young dogs, respond to efficient anthelmintic therapy. As a corollary, it is suggested that prognosis becomes poorer with age and as the duration of infection increases. The part played by microfilarial worms in the production of pathological changes is obscure. Dead worms which are swept into the finer branches of the pulmonary artery usually produce extensive infarction of the lungs, and exercise should be reduced to a minimum during treatment and for about two months afterwards.

See also abst. **538** (book).

The available anthelmintics vary in their effects on adults and microfilariae. Antimony compounds are uncertain in their action on adults and may give a false appearance of clinical cure by destroying microfilariae and sterilizing adult females. They are also potentially toxic. Many non-metallic organic compounds have been studied: of these, the cyanine dyes and hetrazan (1-diethylcarbamyl-4-methyl-piperazine dihydrogen citrate) destroy microfilariae, but have no appreciable action on adults. The phenyl arsenoxides are outstanding in that they act primarily against the adult worms. Arsenamide is recommended for routine therapy at a dosage of 1·0 mg. (0·2 mg. As) per kg. live weight, daily, for 15 days. It is given intravenously in a 2% or 1% solution; there is some evidence that the latter is less irritant if perivascular leakage occurs.

—E. Parker Pollard.

Yoeli, M., Roden, A. T., & Abbott, J. D. (1948.) **1. Smears from subcutaneous nodules of a mule showing microfilariae (?) *Onchocerca* sp. 2. Development forms of (?) same species in *Anopheles sacharovi* and *A. maculipennis typicus*. [Demonstration. Laboratory Meeting.]**—*Trans. R. Soc. trop. Med. Hyg.* **41.** 444. **426**

The specimens shown at the demonstration were obtained in Eastern Macedonia in 1946. Developmental forms of filariae were observed in 3% of 450 dissections of *Anopheles sacharovi* and in one *A. maculipennis typicus*. No evidence of filariasis was found in the local human population, though local horses and mules were observed with subcutaneous nodules and microfilariae from these lesions were demonstrated.—G. M. Urquhart.

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

Laffolay, B. (1946.) Les tumeurs de la mamelle chez les herbivores. **[Mammary tumours in herbivorous animals.]**—*Thesis, Alfort.* pp. 92. **427**

The account of mammary tumours in this thesis is based mainly on a review of the literature (including other theses), but L. also describes a case of an "atypical duct carcinoma" which he observed in a mare. Some attention is paid to reports of negative findings. Species dealt with are the horse, ox, sheep and goat. An account is given of the anatomy, histology, and development of the mammary glands, followed by a chapter on the recorded cases found by L., these tumours being described at some length. There is a chapter on clinical features, and a brief summary. It is stated that mammary cancer in the animals dealt with was first recorded by Dubois in 1828 in the mare. Mammary tumours, less common in herbivora than in carnivora, appear most frequently in the mare, a very few cases only being recorded in the ox. Two records of mammary tumours in sheep are mentioned (one of epithelial, one of mesodermal origin, both malignant), and three records in goats—one adenoma and two carcinomas.

Not all the authors quoted are referred to in the bibliography. Some of the missing references can be traced in Feldman's monograph (1932) on the Neoplasms of Domesticated Animals.

—E. Cotchin.

Barber, C. W. (1948.) **Transmission experiments on the avian leucosis complex.**—*Cornell*

Vet. **38.** 130–134. [Author's summary copied *verbatim.*] **428**

Four groups of day-old White Leghorn pullets were housed separately and treated as follows: Two of the groups were controls. A third group was exposed to nasal mucus from older normal and paralyzed birds. The mucus was instilled into the nasal passages and eyes of the experimental chicks. The fourth group of chicks was fed 20 to 25 per cent fresh chicken manure from normal older chickens and from paralyzed fowls. Groups 1, 2, and 3 were fed 20 to 25 per cent turkey manure (free from avian leucosis complex virus) to balance any side effects from the manure feeding in group 4. The exposure period for the experimental chicks was 31 days. Statistical analysis of the results did not reveal any significant differences in the incidence of leucosis between any of the groups. It is concluded that under the conditions of this experiment transmission of the avian leucosis complex did not occur.

See also abst. **518** (fibroids).

NUTRITIONAL AND METABOLIC DISORDERS

Ajl, S. J., & Werkman, C. H. (1949.) **On the mechanism of carbon dioxide replacement in heterotrophic metabolism.**—*J. Bact.* **57.** 579–593. [Authors' summary copied *verbatim.*] **429**

All compounds replacing CO_2 function by yielding keto acids, which in turn by amination, transamination, or similar reactions serve as substituents for carbon dioxide.

Jaffé, E. R., Humphreys, E. M., Benditt, E. P., & Wissler, R. W. (1949.) **Effects of various degrees of protein depletion on histologic and chemical structure of rat liver.**—*Arch. Path.* **47.** 411–423. [Authors' summary copied *verbatim.*] **430**

An experiment made with young adult male rats illustrates the histologic and chemical changes which occur in the livers of animals restricted to a low protein diet for variable periods. An initial fall in tissue mass parallels a decrease in lobule and cell size with the appearance of a small droplet fatty change. A secondary rise in liver weight is associated with a disproportionate increase in fat which is reflected in a diffuse fatty alteration. Subsequent depletion reduces both the quantities of water, fat, protein and water-soluble fraction and the visible cell size and fat content. After prolonged protein deprivation another increase in stainable and chemically detectable lipids occurs, while marked atrophy of cytoplasm and irregularity of nuclear arrangement appear. Despite the severity of the histologic and chemical alterations, the entire process quickly undergoes complete reversal when a diet containing a high quality protein is fed. The mechanisms which operate in the production of the hepatic changes of the cachectic states associated with some human diseases may be similar to those operating to produce the alterations observed in this experiment and may be induced by undernutrition, principally depletion of protein.

Sheehy, E. J., O'Donovan, J., Day, W. R., & Curran, S. (1948.) **Aphosphorosis in cattle in County Offaly.**—*J. Dep. Agric., Eire.* **45.** 5–28. **431**

A brief review is given of the incidence and symptoms of aphosphorosis in the County of Offaly. To establish the presence of the disease, the authors describe eight controlled feeding tests in which affected cows were given different mineral supplements. Results were determined by the responses of the test animals. A comparison is drawn between the composition of herbage, dry fodder and soil of affected areas and of those fields on which aphosphorosis did not occur. The response of herbage and soil to the application of phosphatic manure and fertilizer was investigated and the effect upon grazing animals recorded.—E. F. Lewis.

Olsson, E. (1948.) Försök med kobolt-tillskott åt nötkreatur i besättningar med bestående bristsjukdomsbesvär av skravelsjukenatur. [**Experimental feeding of cobalt supplements to cattle with deficiency diseases of an acetonaemic nature.**]—*Skand. VetTidskr.* **38.** 625–642. [English summary.] **432**

Seventy-five cattle on two selected farms in the province of Dalarna, where the incidence of deficiency diseases of an acetonaemic nature had been persistently high, were fed cobalt supplements of 1·5–10 mg. daily for young animals and 3·5–20 mg. for adults, mixed with dried yeast, for ten days, after which 1·5–1·8 mg. was given to young animals and 3·5 mg. to adults, the treatment being continued for six months. A control group [number not stated] was fed a supplement of molasses and phosphate. Results of treatment were satisfactory: 72 of the 75 cattle regained normal health. In the animals of the control group there was no improvement and in two there was deterioration.

The author points out that the dried yeast preparation was found on analysis to contain no demonstrable trace of copper. He used dried yeast mixed with the cobalt because he had found

in earlier work on "skravelsjuka" that dried yeast alone was effective with that disease [*V. B.* **18.** 262].—F. E. W.

POPE, A. L., PHILLIPS, P. H., & BOHSTEDT, G. (1947.) **The effect of cobalt on growth and certain blood constituents of sheep.**—*J. Anim. Sci.* **6.** 334–342. **433**

A widespread outbreak of parasitic infestation in sheep associated with anaemia and with high mortality was checked in N. Wisconsin by distributing a salt mixture containing several trace elements. The condition could be reproduced by feeding a diet deficient in cobalt. Feeding cobalt to such sheep produced a rapid improvement in appetite with weight gain and increased values for vitamins A and C in the serum. Haemoglobin values rose more slowly. Attention is drawn to the greater effect of cobalt-deficiency in sheep than in cattle, resulting from the higher incidence of parasitic infestation in the former.—P. HERBERT.

RAY, S. N., WEIR, W. C., POPE, A. L., BOHSTEDT, G., & PHILLIPS, P. H. (1948.) **Studies on the role of cobalt in sheep nutrition.**—*J. Anim. Sci.* **7.** 3–15. **434**

Cobalt-depleted lambs received supplements of thiamine, folic acid, pyridoxine or cobalt. Haemoglobin, weight and food consumption were compared with a control group (five animals in each group). Vitamins were injected and cobalt was given *per os*. All groups had low haemoglobin values—most marked in thiamine-treated animals. Thiamine and cobalt groups had the better weight gains. Feed intakes paralleled weight changes except in the pyridoxine group which had good appetites and poor weight gains. Other experiments indicated that injected cobalt had a slower action than fed cobalt on appetite and weight, but the effect on haemoglobin was about the same. Values are reported for liver fat and cobalt content. —P. HERBERT.

KEENER, H. A., PERCIVAL, G. P., & MORROW, K. S. (1948.) **A study of cobalt deficiency in New Hampshire with sheep.**—*J. Anim. Sci.* **7.** 16–25. **435**

Cobalt deficient diet was fed to 20 ewe-lambs and produced a borderline deficiency syndrome characterized by slow weight gains and high parasitic infestation. Blood counts were not indicative of such borderline deficiency, but analysis of blood serum and of spleen, kidney and liver tissues for cobalt was of diagnostic value. —P. HERBERT.

SHEEHY, E. J. (1947.) **Cobalt deficiency in Sligo. [Correspondence.]**—*Nature, Lond.* **160.** 878. **436**

A farm in Co. Sligo is described where herbage is deficient in cobalt. Sheep and cattle are affected and respond well to cobalt feeding. On neighbouring farms alternative pastures are available and no deficiency is observed.—P. H.

FRASER, A. (Undated.) **Cobalt in animal nutrition.** pp. 13. London: Mond Nickel Co., Ltd. **437**

Widespread cases of inanition and death of ruminants on apparently rich and abundant pasture have been caused by cobalt deficiency in the diet and are curable by administration of cobalt sulphate, chloride or nitrate, in amounts varying from 0·1–1 mg. per animal per day. On farms cure can be effected by individual dosage, by provision of salt licks or mineral supplements or by treating the affected pastures with cobalt salts. Cobalt deficiency is now recognized as the cause of bush sickness in New Zealand, nakuruitis in Kenya, pining in various parts of Britain, Grand Traverse disease and neck-ail in the U.S.A. Coast disease in Australia and "salt lick" in Florida require copper as well as cobalt to effect cure.—R. MARSHALL.

BARRON, G. P., BROWN, S. O., & PEARSON, P. B. (1949.) **Histological manifestations of a magnesium deficiency in the rat and rabbit.**—*Proc. Soc. exp. Biol., N.Y.* **70.** 220–223. **438**

Cerebellar tissue was examined from young rats fed for 12 days on a diet containing only from 1–80 mg. of magnesium per 100 g., and from sexually mature rats maintained on a similar diet for 7–13 weeks. Cerebellar, cardiac and renal tissue were also obtained from rabbits started on a purified diet at weaning and maintained on it, thus receiving only 5–85 mg. of magnesium per 100 g. of diet for ten weeks.

In the young rats receiving 1 or 5 mg. %, and in mature rats receiving 1 mg. %, neuropathological changes were observed, characterized by degeneration of the cerebellar Purkinje cells. At higher levels of magnesium intake no such changes were observed.

In the rabbits receiving only 5 or 10 mg. % magnesium for ten weeks, degenerative changes were observed in the Purkinje cells, but these changes were not identical with those found in the rats. Pathological changes were demonstrated in the kidneys of rabbits maintained on a diet containing 5 mg. % of magnesium. Radiography of renal sections failed to reveal zonary calcification. The authors concluded that the tissue damage caused by a magnesium deficient diet is such as to explain the lack of success in treating hypomagnesaemic convulsions in the rat by the injection of magnesium salts. The clinical manifestations of magnesium deficiency are not merely the result of an ion imbalance in body fluids.—L. M. MARKSON.

GREEN, H. H. (1947.) **Trace elements in relation**

to health of livestock.—*Ann. appl. Biol.* **34.** No. 1. 159–165. **439**

Deficiency of iodine in British soils is insufficient to cause symptoms in livestock, although intake below the optimum may be of importance. In the U.S.A. and some European countries, goitre in all species of large domestic animal, congenital goitre in lambs, and (in the U.S.A.) hairless pigling disease (foetal athyrosis) which is also caused by iodine deficiency, have been observed. Controlled feeding of iodized salt prevents symptoms.

Copper deficiency (less than 5 p.p.m. of dry matter of grass) in Australian pastures causes "falling disease" in adult cattle and stunted development in calves. It also causes enzootic ataxia, a demyelinating disease of lambs, in the offspring of copper deficient ewes. Swayback in Britain is similar to enzootic ataxia, but some other factor or factors must be involved as the complaint occurred in animals on pastures which are not deficient; transference to another neighbourhood, but to a diet still artificially deficient in copper, resulted in recovery of blood copper levels and normal lambing. A licking disease of ruminants in Schleswig-Holstein and the Eastern Netherlands is also caused by copper deficiency. Practical methods of treatment are the provision of salt licks containing copper or dosing or injection with copper sulphate.

Cobalt deficiency (less than 0·07 p.p.m. in pasture dry matter) causes a wasting disease of ruminants—enzootic marasmus in Australia; bush sickness in New Zealand and pining in Britain; in Britain mortality rate may reach up to 80% or in areas where pining is less acute there may be poor development. The condition may be effectively treated by cobalt licks, oral administration of cobalt or dressing of the pasture with cobalt chloride.

"Perosis", or "slipped tendon" of chicks is the only disease which has been satisfactorily attributed to manganese deficiency.

Selenium can be taken up by certain plants from relatively insoluble minerals and by them made available to other plants. Such seleniferous pastures are toxic to livestock. Acute poisoning causes blind staggers, a liver disease, while progressive selenium poisoning causes alkali disease of horses, with a depressed growth rate and degeneration of hair and hoofs, and in poultry non-viability of eggs or hatching of monsters, these diseases occurring in the U.S.A. There are no reports of selenium poisoning of stock in Britain. Selection of forage plants which are not "selenium converters", drainage and control of overstocking are means employed for control.

A similar property of plants with power to accumulate molybdenum from soils rich in this element, gives rise to pastures which cause a poisoning of ruminants with acute diarrhoea ending in death if untreated, known as "teart" and found chiefly in Somerset but also in Gloucester and Warwick. A daily dose of 2 g. of copper sulphate per animal is an effective antidote in cattle.

Fluorine poisoning of livestock, causing bone and tooth disorders, occurs spontaneously in North Africa and Iceland, while elsewhere, feeding with ground rock phosphate or industrial contamination of soils causes fluorine poisoning.

—R. MARSHALL.

WARD, G. M., & REID, J. T. (1948.) **Mineral metabolism studies in dairy cattle. II. Effect of calcium and manganese and other trace elements on the metabolism of lipids during early lactation.**—*J. Nutrit.* **35.** 249–255. [Authors' summary copied *verbatim*. For part I, see *V. B.* **19.** 291.] **440**

A study was made of the effects of Ca, Mn, and other mineral element supplementation upon the metabolism of the lipids during the first 5 months of lactation of 8 Holstein and 4 Guernsey cows.

All groups excreted similar proportions of the total lipid intake, as measured by acid hydrolysis and $CHCl_3$ extraction, regardless of the mineral supplement received. Therefore the observed group differences relative to the smaller proportion of ether extractives lost in the feces of animals receiving supplemental Ca were attributed to an increased formation of soaps which were not measured in the feces of these animals because of the insolubility of soap in di-ethyl ether, and not to a more efficient lipid use. Although the ingestion of Ca tended to spare neutral fat and sterols, a corresponding increase was observed in the excretion of soaps and free fatty acids, resulting in a qualitative rather than a quantitative effect.

These data would indicate that the estimation of crude fat by the commonly employed ether extraction procedure is likely to be misleading in experiments involving the analysis of dairy cow feces.

NEWMAN, P. E. (1948.) **Vitamin and trace minerals in the diet of cattle.**—*Cornell Vet.* **38.** 69–78. **441**

N. suggests that, for the daily vitamin A requirements of cattle based on carotene as the source, even the standards adopted by the National Research Council may be too low in individual circumstances. Concentrates may provide little or no carotene and the contribution of roughages is extremely variable. Attention is drawn to the low carotene content of dried-up summer pasture

and to the oxidative destruction of vitamin A and carotene in mixed rations.

Cobalt deficiency is stated to have been recognized in parts of Wisconsin, Michigan and New Hampshire among herds that are fed largely or entirely upon locally grown feeds, and to be manifest most frequently in growing stock. There is failure of appetite, first for grain, then for silage, and finally for hay. There is loss of weight, harshness of the coat, a tight, hard skin, dulness of the eyes and, usually, constipation. The blood haemoglobin level is usually lowered to between 7–10 mg. per 100 ml. The administration of small amounts of soluble cobalt compounds results in gradual recovery. As a prophylactic, cobalt is supplied in salt, at the rate of 1 oz. of cobalt sulphate per 100 lb. salt, or in the grain mixture at a level of 1 p.p.m. (of the sulphate). N. quotes the findings of KEENER (1947), unfavourable results upon appetite and well-being from too high a dosage of cobalt being reported. It is stated that amounts in excess of 50 mg. of elemental cobalt daily (equivalent to 20 p.p.m. in a calf grain ration) are dangerous when administered over an extended period.—ALASTAIR N. WORDEN.

ALVAREZ, J. G. (1947.) **Vitamin A deficiency of cattle in Colombia, South America.**—*J. Amer. vet. med. Ass.* **111.** 216–217. **442**

Keratitis was observed during the hot weather when the pastures were parched, and was characterized by lachrymation and loss of vision, ulceration and opacity of the cornea and photophobia. In pregnant cows, gestation was sometimes prolonged and parturition was difficult, but even when parturition was normal, injuries to, or retention of, the placenta occurred. In several cases, the calves were born without teeth, and A. considers that lack of vitamin A during gestation was responsible for this. Vitamin-A deficiency symptoms were prevalent in pregnant females and in cows suckling calves, but rare in males and growing calves. In cows injected with vitamin A or transferred to green pasture, the eye affections were cured in 14 and 32 days, respectively. No experimental data are given.—E. M. CRUICKSHANK.

BONFILS, S., & MARNAY, C. (1948.) Résultats de l'épreuve d'hypervitaminémie A provoquée chez des sujets normaux et pathologiques. **[Hypervitaminaemia A in normal and pathological subjects.]**—*C.R. Soc. Biol. Paris.* **142.** 29–31. **443**

Vitamin A was estimated in normal and pathological subjects before and six hours after dosing with 200,000 I.U. of vitamin A. The observations were divided into three groups according to the blood level of vitamin A at the sixth hour, at which time maximum values were reached. The group with normal increases of 500–1,000 I.U. over a resting level of 60–185 I.U. per 100 ml. comprised two normal subjects, two with hypertension, one with tabes, two with rectocolitis, two with thyroid abnormalities which were receiving treatment with thyroid extract or "abadol" and one cured of lipoidal nephrosis. The group with abnormally high increases of more than 1,000 I.U. over a resting level of 74–213 I.U. per 100 ml. comprised one case of lipoidal nephrosis, one of congenital myxoedema and one of menopausal myxoedema. Treatment with thyroid extract in the first two of these cases reduced the increase after vitamin-A dosage to normal levels. The third group, comprising three patients with Graves' disease, one with acromegaly, and one pregnant woman had low resting values of 0–82 I.U. per 100 ml., and the increases were also low, *viz.*, less than 500 I.U.—E. M. CRUICKSHANKS.

WISE, G. H., ATKESON, F. W., CALDWELL, M. J., PARRISH, D. B., & HUGHES, J. S. (1947.) **Effects of high vitamin A intake on milk and fat yields and on vitamin A constituents in milk, blood, and livers of dairy cows.**—*J. Dairy Sci.* **30.** 279–291. **444**

In Jersey, Guernsey and Holstein cows of similar stages of lactation, milk yield and body weight, in those given a standard ration supplemented by 1,250,000 I.U. of vitamin A per head daily, the total milk yield and fat production were not affected, but the vitamin A content of the milk fat was increased to approximately four times that of the fat of control cows not given the supplement, and the carotene content was lowered. In two Ayrshire cows given vitamin A during the final stage of gestation, the decline in the plasma level which usually occurs after parturition was not prevented, though higher levels were maintained than in non-supplemented cows. Livers from cows slaughtered 24 hours after receiving the last vitamin A supplement contained approximately four times as much of the vitamin as the livers of the control cows, but the serum levels were similar in both groups. No correlation was found between liver reserves and serum values.

—E. M. CRUICKSHANK.

THOMAS, J. W., LOOSLI, J. K., & WILLIAM, J. P. (1947.) **Placental and mammary transfer of vitamin A in swine and goats as affected by the prepartum diet.**—*J. Anim. Sci.* **6.** 141–145. **445**

Does and sows were given standard rations or these rations supplemented with vitamin A, the does being given 160,000 I.U. and the sows 406,000 I.U. of vitamin A per head daily during the last quarter of gestation. One sow received 406,000 I.U. of carotene in place of vitamin A during this period. After four weeks of supple-

mentation the plasma value of vitamin A in the does rose from 35–57 μg. per ml.

In new-born animals from mothers on the standard and supplemented rations, the vitamin A values were :– in plasma, of kids 2 μg. and 10 μg. per 100 ml. respectively, and of pigs 6·4 μg. and 9·1 μg. respectively; in liver, of kids 0·06 μg. per g. of fresh tissue and 9·9 μg. respectively, of pigs 4·73 μg. and 35 μg. per g. respectively. Administration of carotene to the sow did not increase the vitamin A content of the liver of the piglet above the normal. The vitamin A content of the colostrum of does on the standard ration was 433 μg. on the first and 137 μg. per 100 ml. on the second day and of does receiving supplementary vitamin A, 1,353 μg. and 361 μg. The first day's colostrum of sows on the standard and supplemented rations contained 169 μg. and 519 μg. respectively. The concentration of carotenoids and vitamin A in the colostrum of the sow receiving supplementary carotene was similar to that in the normal colostrum. Only traces of carotenoids were found in the plasma and in the livers of new-born kids and piglets.—E. M. C.

Wise, G. H., Caldwell, M. J., Parrish, D. B., Atkeson, F. W., & Hughes, J. S. (1948.) **Relation of typical postnatal changes in the diet of the dairy calf to the concentration of carotenoids and vitamin A in the blood serum.** —*J. Anim. Sci.* **7.** 70–77. **446**

Carotene and vitamin A were estimated in the blood serum of 11 normal dairy calves from birth to ten weeks of age. The calves received colostrum for the first three days, and whole milk from the 4th–28th day. The transition from whole to separated milk was made gradually from the 4th–5th week. After two weeks of age the calves had access to a concentrate mixture and hay, but little was eaten until the fifth week. Samples of venous blood were collected before colostrum consumption, on each of the three days after birth, and thereafter at weekly or fortnightly intervals. Considerable individual variation in carotene and vitamin A content of the serum was observed, but the trend was similar in all cases. Both constituents were low at birth, but increased greatly after ingestion of colostrum. After this period the concentrations decreased steadily, until by the fifth week they reached levels which might be considered subnormal, although there was no clinical evidence of vitamin A deficiency. By the tenth week both constituents had risen again to the values found in the colostral period. Diet seemed to be the chief factor responsible for these changes. It is suggested that the marked reduction in carotene and vitamin levels which occurs during whole milk feeding indicates a need for vitamin A supplementation during this period.
—E. M. Cruickshank.

Madsen, L. L., Eaton, O. N., Heemstra, L., Davis, R. E., Cabell, C. A., & Knapp, B., Jr. (1948.) **Effectiveness of carotene and failure of ascorbic acid to increase sexual activity and semen quality of vitamin A deficient beef bulls.** —*J. Anim. Sci.* **7.** 60–69. **447**

Six young beef bulls received a basal ration of grain and oat straw supplemented with 45–140 μg. of carotene per kg. body weight daily from alfalfa. The bull receiving 45 μg. per kg. had symptoms of vitamin-A deficiency as a calf and later, lack of sexual activity, but reproductive performance in the other animals was normal. Two bulls were then deprived of the carotene supplement, and within 64 days developed symptoms of vitamin-A deficiency as evidenced by incoordination in mounting and impairment of vision. Later one bull became totally blind. The percentage of abnormal spermatozoa and cellular debris increased greatly as the deficiency progressed. Resumption of carotene feeding rapidly restored the reproductive ability to normal, but injections of ascorbic acid were without effect.
—E. M. Cruickshank.

Schultz, L. H., Smith, V. R., & Lardy, H. A. (1949.) **Blood sugar studies in relation to ketosis in ruminants.**—*J. Dairy Sci.* **32.** 718. (Only abst. given, copied *verbatim.*] **448**

This study was undertaken in an effort to obtain additional information regarding the relationship between blood sugar and blood ketone levels in ruminants. Goats were used in all of the studies. By means of daily injections of 80 units of protamine zinc insulin it was possible to maintain blood sugar levels below 30 mg. % for a week with no increase in blood ketones or particularly adverse effects upon the animal. Intravenous injection of alloxan at the rate of 90 mg./kg. of body weight caused an initial hyperglycemia, then a hypoglycemia and finally a marked and permanent hyperglycemia. There was a gradual but marked increase in blood ketones. Daily subcutaneous injections of 1 g. of phlorhizin for a period of 1 wk. resulted in the excretion of approximately 40 g. of glucose daily but caused no marked changes in either blood sugar or blood ketone levels. Oral administration of 15 g. of ketogenic fatty acids (particularly butyric and caproic) caused marked but very transitory changes in blood sugar levels. First there was a hyperglycemia, then a hypoglycemia and finally a somewhat longer period of hyperglycemia. The lowered blood sugar immediately followed the peak of ketone body production.

Shaw, J. C., Saarinen, P. V., Hadjiolos, B. C.,

& LEFFEL, E. C. (1949.) **Biochemical and histopathological studies of fasting ketosis and spontaneous ketosis of cows.**—*J. Dairy Sci.* **32.** 718. [Only abst. given, copied *verbatim.*] **449**

Most of the biochemical alterations observed in the blood and various organs of cows with spontaneous ketosis can be produced by fasting cows in the early postpartal period. All the blood lipid fractions are low in both fasting and spontaneous ketosis. The plasma organic acid-soluble phosphorus is low in both cases. The inorganic phosphorus varies widely in both cases. Phosphatase values decrease in both fasting and spontaneous ketosis. Ca, Na, K and Cl values are normal in both cases. In the early stages of spontaneous ketosis the liver fat often approaches normal values. The fatty liver observed in the later stages of spontaneous ketosis appears to be due primarily to fasting. The increase in the liver fat in both fasting ketosis and the later stages of spontaneous ketosis appears to be due mainly to glycerides. The ester cholesterol increases in both cases but tends to be higher in spontaneous ketosis. The total cholesterol in the liver varies within normal limits in both cases. Of particular significance is the fact that at the same low level of blood glucose, ketonemia is much more marked in spontaneous ketosis than in fasting ketosis. The liver glycogen is depleted markedly in both cases. Cows exhibiting fasting ketosis do not show clinical symptoms known to be associated with spontaneous ketosis though the blood glucose values may be very low. In fasting ketosis as well as in spontaneous ketosis, the liver, kidneys, and all of the endocrine glands exhibit fatty phanerosis. In the later stages of spontaneous ketosis there is a marked degeneration of the epithelial cells of the various organs and endocrine glands, and severe damage to the convoluted tubules of the kidneys always has been observed. In most cases of spontaneous ketosis significant alterations have been observed in the anterior lobe of the pituitary. Also, in spontaneous ketosis the adrenal glands always are enlarged, with the degeneration of the epithelial cells being most marked in the zona glomerulosa.

STOKSTAD, E. L. R., JUKES, T. H., PIERCE, J., PAGE, A. C., Jr., & FRANKLIN, A. L. (1949.) **The multiple nature of the animal protein factor.**—*J. biol. Chem.* **180.** 647–654. [Authors' summary copied *verbatim.*] **450**

A method for the biological assay of "animal protein factor" with chicks is described.

A level of 15 γ per kilo of diet or 0·3 γ injected intramuscularly each week was found to supply the vitamin B_{12} requirement of the chicks, but maximum growth was not obtained until certain other supplements were added. Yeast, alfalfa meal, distillers' solubles, or fish solubles had little or no effect in this regard.

A fraction from *Streptomyces aureofaciens* cultures was found to have a higher potency for chicks than *Lactobacillus leichmannii* as a source of vitamin B_{12}.

The oral potency of vitamin B_{12} was found to be 50 per cent that of the injected potency as estimated by the effects of a concentrate administered weekly. This efficient utilization of the orally administered vitamin in normal animals is contrasted with the reports of its inefficient use by patients with pernicious anemia.

SWAN, L. C. (1949.) **Observations on an arthritic condition in swine associated with pellagra.**—*Canad. J. comp. Med.* **13.** 12–15. **451**

This condition was first observed in 1941 and was thought to be a form of rickets, but it did not respond to vitamin D therapy. The pigs were purchased as weanlings for raising on fruit farms. After about ten days the pigs began to look rough, developed encrusted particles on the edges of the ears and had continuous diarrhoea. Some developed severe joint swellings. The temperature was 104°–107°F. They were unable to get up to eat and, if attention was not given, they were trampled and soon died. The joints responded rapidly to intraperitoneal injections of 0·5–1·0 ml. per lb. body weight of 5% sodium sulphadiazine. A compound of nicotinic acid and iron was used in some herds from time of purchase and in such herds there were no joint lesions.

—R. GWATKIN.

BERLIN, R. (1948.) **Haff disease in Sweden.**—*Acta med. scand.* **129.** 560–572. [Abst. in *Bull. Hyg., Lond.* **23.** 884. (1948), copied *verbatim.* Signed: H. HAROLD SCOTT.] **452**

The symptoms of Haff disease may be recapitulated briefly. About 18 hours after eating certain fish—perch, bream, roach, eel, burbot [*Lota lota*]—the patient is suddenly seized with acute pain and tenderness in the muscles (except those of the head and face), the merest touch causing agony, and movement is impossible. Urine passed after the onset is of a brownish-black colour and albuminous, with perhaps a few red and white corpuscles and granular casts. The reaction for myoglobin is positive. The symptoms pass off in 48 hours or so, leaving only slight tenderness and stiffness. There is no rise of temperature. Some patients are repeatedly attacked (one girl of 16 years is reported to have had 7 such attacks), while others partaking of the fish escape altogether. Hence it is thought that there may be some idiosyncrasy. Birds and

animals eating the fish die in considerable numbers.

Investigations as to the actual cause have ruled out bacterial or virus infection, poisoning from discharge from factories, selenium, plankton, and allergy to extracts of the fish. There does, however, seem to be some resemblance between this disease and the Chastek disease on silver fox farms in America after the animals have been fed on certain raw fish, and the symptoms of the latter disease can be produced experimentally by a diet deficient in vitamin B_1 and recovery follows administration of this vitamin. Further study has demonstrated that certain fish contain a substance which inactivates vitamin B_1. If this is the case in Haff disease, intravenous injection of aneurin should bring about rapid recovery. In other words, Haff disease may be the result of " a disturbance in the metabolism due to the presence, in the flesh and liver of certain kinds of fish, of an " antivitamin " which is capable of completely suspending or reducing the biological action of aneurin ". [In this connection, attention is to be drawn to a paper by OWEN and FERREBEE [*Bull. Hyg., Lond.* (1944.) **19.** 142] on an anti-thiamin factor in the viscera, heads, scales and skin of certain fish.]

See also absts. **284** (and TB.); **456** (osteodystrophia); **481** and **510** (vitamin A); **487** (vitamin E); **543** (book).

DISEASES, GENERAL

MITCHELL, W. M. (1949.) **Intermittent luxation of the patellae in a hunter.**—*Vet. Rec.* **61.** 352–353. **453**

After a train journey a horse was treated for intermittent luxation of the patellae and recovered. Two months later the condition reappeared, became worse and the horse was slaughtered. P.M. no lesions were found in the stifle joints. The ventral roots of the sixth lumbar and the first sacral nerves on the left and of the fifth lumbar nerve on the right side were deeply congested. The right and left sciatic nerves were also congested in the region of the hip joint. Microscopic examination revealed replacement of nerve fibres by fibrinoid material. It is suggested that the rail journey threw an excessive strain on the already degenerated nerve, resulting in loss of tone and luxation of the patella. A subsequent active neuritis was probably responsible for the unfavourable termination.

Twelve photomicrographs of the affected nerves are included in the text.—J. G. O'S.

STECK, W., & ROOST, E. (1949.) Zur Pathogenese der chronischen Bronchiolitis beim Pferde. **[Pathogenesis of chronic bronchiolitis in horses.]** —*Schweiz. Arch. Tierheilk.* **91.** 427–436. [English, French and German summaries. Abst. from English summary.] **454**

The possible causes of the persistence of chronic bronchiolitis in the adult horse are discussed. Neither cardiac disease nor chronic alveolar emphysema appeared to be direct causes. Cultural investigations of the bronchiolic mucus of 11 lungs from affected horses yielded negative results. From the evidence available it is unlikely that repeated irritation by inhaled harmful substances, hyperergy of the bronchiolic epithelium or chronic infection were responsible for the condition.

The authors suggest that difficulty in expelling the bronchiolic mucus and consequent changes in the bronchiolic lining are probably related to the onset of the disease.

VEENSTRA, R. H. (1949.) **Skin and subcutaneous lesions II.**—*Tijdschr. Diergeneesk.* **74.** 97–102. [Title in English; text in Dutch. Abst. from English summary.] **455**

So-called " skin TB." lesions were found more often in cattle imported from Eire than in Dutch cattle. The lesions were, as a rule, larger, more virulent and more extensive in the Irish cattle in which the limbs also were more frequently affected. A striking though unaccountable peculiarity was the ratio of affected fore to hind limbs: 70 : 136 in the Irish cattle, 81 : 22 in the Dutch.—L. M. MARKSON.

POMMIER, M. E. (1948.) Ostéodystrophie du maxillaire inférieur de la chévre. **[Osteodystrophia of the jaw bones in goats.]**—*Rec. Méd. vét.* **124.** 510–511. **456**

Seven cases of ostitis fibrosa in stabled goats characterized by softening and enlargement of the jaw bones to such a degree as to interfere with prehension of food are described. In two of the cases there was lameness in addition to the jaw lesions. No cases were seen in goats which grazed on free range. Treatment by giving soft food to which vitamin D and calcium phosphate had been added was successful in six cases.—M. C.

SCHACHTER, M., & SCHACHTER, R. (1949.) **The production of visceral lesions following attempted chronic irritation of the central nervous system.**—*Canad. med. Ass. J.* **60.** 607–609. **457**

A focus of irritation was established in the central nervous system of dogs by a glass bead 6 mm. in diameter placed intradurally between the anterior ends of the pedunculi. Sixteen dogs which survived the operation were examined at an

interval of four days to over three months. The lesions found were—bleeding and pus formation at the gingival margins with grey or black discoloration of the teeth, loss of teeth, ulcerations of the buccal mucosa and lip margin, multiple duodenal ulcerations, liquid faeces, gross red blood in the faeces, haemorrhagic mucosa and pinpoint ulcerations in the colon.—P. J. G. PLUMMER.

JUNGHERR, E. (1948.) **Differential diagnosis of respiratory diseases of poultry.**—*Vet. Ext. Quart. Univ. Pa.* **48.** 3–8. **458**

A brief description of the common respiratory diseases and the tests which can be used to effect diagnosis.—L. G. DONALD.

STEWART, W. L., & ADAMSON, C. M. (1949.) **Notes on pullet disease.**—*Brit. vet. J.* **105.** 312–317. **459**

The authors describe the main features of an outbreak of pullet disease (blue comb) affecting a flock of pullets 4–6 months old. Of 1,820 affected birds, 87% were running on new leys and 13% on old leys.—D. LUKE.

MILLAR, J. H. D. (1949.) **Disseminated sclerosis. A follow up of 91 cases.**—*Lancet.* **257.** 556–559. **460**

An investigation carried out in Belfast. Nearly all the patients interviewed were asked if they had had any contacts with sheep. In 11 cases out of 49 there was evidence of close contact with sheep.

The Ministry of Agriculture for Northern Ireland informed the author that there was no evidence of the existence of swayback of sheep in Northern Ireland.

MACHT, M. B., BADER, M. E., & MEAD, J. (1949.) **The inhibition of frostbite wheals by the iontophoresis of antihistaminic agents.**—*J. clin. Invest.* **28.** 564–566. [Authors' summary copied *verbatim.*] **461**

Introduction of the histamine antagonists, Pyribenzamine hydrochloride and Benadryl hydrochloride, by an iontophoretic technique inhibited the formation of frostbite wheals in the human skin. In these experiments no other effects of antihistamine agents on the type or progress of localized frostbite lesions were observed. It is concluded from these studies that histamine or a histamine-like substance is liberated in the human skin in the early stages of frostbite.

POISONS AND POISONING

ROSENFELD, I., & BEATH, O. A. (1948.) **Experimentally developed telangiectasis and sawdust liver lesions in rats.**—*J. Amer. vet. med. Ass.* **112.** 386–389. **462**

Rats given toxic doses of selenium developed hepatic lesions similar to those of telangiectasis and "sawdust" liver in cattle, lesions, however, which were different from those of chronic selenium poisoning in cattle. The authors argue that in rats there is a lower tissue susceptibility to selenium and they infer that sub-toxic amounts of selenium may produce similar pathological changes in cattle.—L. M. MARKSON.

FIALA, J. (1948.) Obrna vepřů a otrava solaninem. **[Porcine encephalomyelitis and solanine poisoning of pigs.]**—*Čas. československ. Vet.* **3.** 169–170. **463**

Piglets on a diet containing a large proportion of potatoes, the sprouting shoots of which had not been removed, developed solanine poisoning. F. suggests that in suspected porcine encephalomyelitis the possibility of solanine poisoning should be considered.—E. G.

PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections see under the appropriate disease)

DUDLEY, R. A., & DOBYNS, B. M. (1949.) **The use of autoradiographs in the quantitative determination of radiation dosages from Ca^{45} in bone.**—*Science.* **109.** 327–328 & 342. **464**

It is important to determine, before radioactive tracers may safely be introduced into the human body, that the concentration will not become great enough at any point to constitute a health hazard. The dosage limit at present accepted as safe by the Atomic Energy Commission is 0·1 rem (roentgen equivalent man) *per diem*, or 0·1 rep (roentgen equivalent physical) *per diem* for β-rays. Conventional counter measurements give information regarding average dosages over a large area, a value which, it is stated, may be several times smaller than the local dosage rates. An autoradiographic technique has therefore been developed to measure quantitatively local dosage rates in tissue.

The method comprises production of an autoradiograph of the tissue being studied and, on the same film, of calibration exposures from radio-active sources of known activity, development of the tissue and calibration exposures simultaneously, and comparison of their blackening microphotometrically.

Some details are given of the application of the method to determine the amount of dilution of radio-active Ca^{45} by normal Ca while passing from the blood to the bones of a growing dog.

—ALASTAIR N. WORDEN.

VAN ESELTINE, W. P., & RAHN, O. (1949.) **The effect of temperature upon bacteriostasis.**—*J. Bact.* **57.** 547–554. [Authors' summary copied *verbatim.*] **465**

Although the bactericidal effect of disinfectants increases with increasing temperature, the bacteriostatic effect decreases. To prevent growth of a staphylococcus at 20 C, 50 ppm $HgCl_2$ are sufficient, but at 30 C, 150 ppm are needed. With most bacteriostatic agents, maximal tolerance is observed at 7 to 10 C below the optimal temperature for growth; with a few compounds, it is at or above the optimum. This can be explained as the result of two opposing processes. Temperature increases the growth rate; it also increases the rate of reaction of the antiseptic with the cell contents. The difference between these two effects determines the growth rate in the presence of the disinfectant. This result cannot be reconciled with the customary assumption that bactericidal and bacteriostatic effects are due to the same reaction. It must be assumed that the two effects are due to reactions with different compounds in the cell, or at least with reaction at different loci. Multiplication of bacteria in the presence of dilute disinfectants is somewhat irregular and unpredictable. Multiplication may start after many days of a continuous decrease in viable cells, after 99·999 per cent of all cells are dead. Such sudden recovery was shown not to be due to adaptation.

BLISS, E. A., & TODD, H. P. (1949.) **A comparison of eight antibiotic agents, *in vivo* and *in vitro*.**—*J. Bact.* **58.** 61–72. [Authors' summary copied *verbatim.*] **466**

Most gram-negative bacilli were considerably more sensitive, *in vitro*, to polymyxin D and B and circulin (Q-19) than to aureomycin, chloromycetin, or streptomycin. The striking exception to this was the behavior of strains of *Proteus* which, as a group, proved extremely resistant to the first three agents. The polymyxins and Q-19 were more effective than the other agents in the control of an experimental *Klebsiella pneumoniae* infection in mice.

Penicillin G and O inhibited the growth of most gram-positive cocci at lower concentrations than aureomycin, chloromycetin, or streptomycin, and were the most active agents in the treatment of an experimental hemolytic streptococcal infection. Although penicillin G protected one breed of mouse against a type I pneumococcal infection at low doses, in another breed both it and penicillin O were much less effective, ranking well after aureomycin.

Chloromycetin, which inhibited the growth of cocci *in vitro* at lower concentrations than streptomycin, was valueless as a therapeutic agent in the pneumococcal and streptococcal infections in mice.

MURRAY, F. J., TETRAULT, P. A., KAUFMANN, O. W., KOFFLER, H., PETERSON, D. H., & COLINGSWORTH, D. R. (1949.) **Circulin, an antibiotic from an organism resembling *Bacillus circulans*.**—*J. Bact.* **57.** 305–312. [Authors' summary copied *verbatim.*] **467**

The discovery of circulin, an antibiotic from an organism closely resembling *Bacillus circulans*, is described. Circulin is similar to polymyxin and aerosporin in its ability to inhibit the growth of gram-negative bacteria more strongly than that of gram-positive bacteria. However, since its bacterial spectrum is sufficiently different from that of polymyxin and that reported for aerosporin, it is probably not identical to either. Circulin is inactivated by crude trypsin, whereas polymyxin is not.

A paper-disk-agar method that is essentially identical to the assay method for polymyxin can be used for the quantitative determination of circulin. A satisfactory medium for the pilot-scale production of circulin is reported that makes the isolation and purification of circulin possible. The procedures involved in the production of circulin as well as the general properties of a relatively pure preparation are described. Circulin appears to be somewhat less toxic than aerosporin but more toxic than polymyxin. Preliminary experiments indicate that it protects white mice against infections caused by *Salmonella typhosa* and *Klebsiella pneumoniae*.

MITCHELL, P. (1949.) **Some observations on the mode of action of penicillin.**—*Nature, Lond.* **164.** 259–262. **468**

The effects of penicillin on the nucleotide-nucleic acid balance of *Staphylococcus aureus* are discussed. The progressive disturbance of this balance appears to be due more to the slowing of the rate of polymerization rather than to a stimulation of synthesis from precursors. The course is consistent with the view that penicillin reacts initially with components involved in nucleotide dissimilation. The glutamic acid accumulation mechanism is unaffected until major changes in the nucleotide fraction have occurred.—M. W.

BRUN, C., DRAGSTED, P. J., & LASSEN, H. C. A. (1949.) **On the passage of penicillin from the blood to the subarachnoid space in normal persons and in patients with various forms of**

meningitis.—*Acta med. scand.* **135.** 133–137. [In English, abst. from authors' summary.] **469**

Under normal conditions penicillin does not pass from the blood to the spinal fluid in measurable quantities, but in various types of bacterial meningitis small or moderate concentrations of penicillin do pass. Even so, to obtain adequate action on the tissues of the central nervous system it is necessary to inject penicillin extrathecally.

BANKS, H. H., SELIGMAN, A. M., & FINE, J. (1949.) **The effect of hyaluronidase on the absorption of parenterally administered radioactive plasma proteins in the dog.**—*J. clin. Invest.* **28.** 548–552. [Authors' conclusions copied *verbatim.*] **470**

Hyaluronidase increases the rate of absorption of plasma proteins injected subcutaneously, one and one-half to three times. It is not antigenic in the doses used herein. It acts more efficiently than pressure. It does not increase the rate of absorption of plasma proteins administered intraperitoneally.

HELLAT, A. (1948.) **Studies on the self-disinfecting power of the skin.**—*Ann. Med. Exper. et Biol. Fenniae.* **26.** pp. 95. [Abst. in *Bull. Hyg., Lond.* **24.** 460–461. (1949), copied *verbatim.* Signed: ELIZABETH TOPLEY.] **471**

Much of this report from the University of Helsinki consists of detailed descriptions of a series of 18 experiments designed to answer the question, "Does the skin possess any self-disinfecting power not due to unspecific exogenous factors?" The tentative conclusion is that it does not, and that of the "unspecific" factors "exsiccation" is the most important.

The *in vivo* experiments consisted of repeated sampling, over hours and days, from the following sites artificially contaminated with different organisms, and covered with dressings according to a technique which is described:– (1) Unwashed human skin. (2) Human skin washed with ether. (3) Filter paper incorporated in the same experimental dressing but efficiently isolated from the skin. The variations in technique make it difficult to assess the significance of differences in results obtained in different experiments. For example, in one experiment organisms survived longer on skin than on filter paper, while in another the results were more variable. In individual experiments observations of considerable interest are recorded, but are based on too few tests to be of significance. It can be concluded from the results of single experiments on a number of persons that:– (1) *Serratia marcescens* [*Chr. prodigiosum*] disappears more slowly from the sole of the adult foot than from the forearm, palm, or infant's sole, and (2) Organisms differ in their rate of disappearance from human skin—*Proteus vulgaris* and *Bact. coli* often disappeared in less than 30 minutes, beta haemolytic streptococci sometimes survived for 24 hours, while *Ps. aeruginosa* and *S. marcescens* occupied an intermediate position.

The relative rate of disappearance of different organisms on the skin was compared with that on pieces of filter paper in Petri dishes. Whatever the humidity or size of inoculum, *Ps. aeruginosa* disappeared more quickly than *S. marcescens* or beta haemolytic streptococci. This parallelism between living skin and filter paper suggests to the author that "exsiccation is the dominant cause of death of microbes upon the skin." [It is of interest that in these experiments the increased humidity was associated with an increased survival time of most organisms, but not of Gram-positive cocci.] The author refers to the literature on the *in vitro* action of fatty acids on different organisms, and tested his strains against oleate and palmitate. Although the differences among his results are probably not significant, the conclusion that "the resistance of microbes to the disinfecting action of the fatty acids *in vitro* is by no means proportionate to their capacity to survive upon the skin" is probably true as far as Gram-negative bacilli are concerned.

Experiment 13 is an attempt to show "the selective action of a drying substrate." Sterile filter papers were dipped in melted agar, thoroughly dried, and inoculated with the test organism. Under these conditions *Staph. epidermidis* multiplied more than *Staph. aureus* or *S. marcescens.* From this the author builds a hypothesis that to persist on the skin organisms must be able to penetrate the relatively dry deeper layers of the stratum corneum by multiplication.

This report adds little to the present knowledge of the fate of cocci on human skin presented by BURTENSHAW, J. M. L. (*Brit. Med. Bull.*, 1945, v. 3, 161) but is of value in contributing more data on the probable rôle of drying on the fate of Gram-negative bacilli.

LESSER, M. A. (1948.) **Dog soaps.**—*Soap & Sanit. Chem.* **24.** 36–38, 161, 163 & 165. **472**

L. reviewed the literature and quoted at length passages and formulae of skin preparations pertaining to canine skin hygiene. He pointed out that while washing is beneficial to a dog's health and comfort, too frequent bathing with excessively alkaline or highly medicated soaps may lead to dandruff or scurfiness, dermatitis and other skin disorders. Generally, dogs should be bathed twice a month during the summer, and once a month in winter.

The ideal dog soap is one that would clean perfectly, destroy odours, kill fleas, improve the

sheen of the coat, medicate the skin and, finally, be unobjectionable to the animal itself. Many formulae of soaps, shampoos and dry cleaning powders are given in the text and criticized where they do not meet the necessary requirements.

—W. Moore.

See also absts. **268** (antibiotic of *Staph. aureus*); **269** (toxoids in staphylococcal infections); **283** (antigens); **285** (TB); **287-288** (sulphetrone and streptomycin in TB.); **291** (exotoxin); **299** (mucin infections); **303** (pullorum disease); **311** (bovine foot rot); **314** (actinomycosis); **316** (canine leptospirosis); **326, 327, 328** and **331** (trypanosomiasis); **337** (trichomoniasis in rabbits); **338** (sulphonamides in fowl coccidiosis); **342** (paludrine in canine babesiasis); **352** (F. & M. disease); **379** (sulphonamides); **404, 408-411** and **413-416** (insecticides and repellents); **419** (schistosomiasis); **494** (disinfectants); **499** (fumigant).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

Adrian, E. D. (1946.) **The somatic receiving area in the brain of the Shetland pony.**—*Brain.* **69.** 1–8. [Author's summary copied *verbatim.*] **473**

The area of the cerebrum receiving afferent discharges from peripheral receptors has been mapped out by the electrical method in two Shetland ponies. The results agree with those already reported [Adrian, 1943], but give additional information about the representation of the body and limbs.

The receiving area is made up of an anterior part in which the contralateral nostril is represented in considerable detail, and a posterolateral part of about the same size for the contralateral half of the body and the fore and hind limb. The detailed localization in the nostril area agrees with that already described. In the body and limb area the limbs supply the lateral, and the head, neck and trunk the mesial parts.

Owing to the small area of cortex in which the whole body surface is projected there is a great convergence of afferent pathways. Pressure receptors separated by as much as 17 cm. have produced discharges in the same afferent unit to the cortex, and tactile receptors on the trunk 40 cm. apart lead to identical points on the cortical surface. Comparison of the ratio of sensory surface to cortical receiving area suggests that the tactile discrimination of the pony's nostril region is comparable to that of the human hand and not much inferior to that of the pig's snout.

No discharges to the cortex were obtained from the lips. Thus the arrangement in the pony, with detailed representation of the contralateral nostril, contrasts with that in the goat and sheep where the main afferent supply to the cortex is from the lips on the same side.

I. Pounden, W. D., & Hibbs, J. W. (1948.) **The influence of the ration and rumen inoculation on the establishment of certain micro-organisms in the rumens of young calves.**—*J. Dairy Sci.* **31.** 1041–1050. **474**

II. Pounden, W. D., & Hibbs, J. W. (1948.) **The influence of the ratio of grain to hay in the ration of dairy calves on certain rumen micro-organisms.**—*Ibid.* 1051–1054. **475**

I. Young Jersey and Holstein [Friesian] calves that had been given colostrum were adapted at from 2–4 days of age to twice-daily pail feeding with restricted amounts of pasteurized milk, and were allowed early access to different types of dry food. Some were "inoculated" with ruminal contents by placing a portion of a regurgitated bolus from a mature cow at the back of the mouth; the remainder served as "uninoculated" controls.

Samples of ruminal contents from the calves were examined microscopically, fresh and Gram-stained preparations being employed. The protozoa and the microflora observed were similar to those previously described by British and Continental workers [see Baker, F., & Harriss, S. T., *V. B.* **18.** 471]. The microflora that appeared to be characteristically associated with the feeding of hay were subdivided into "hay flora group (1)", comprising quite large, Gram-positive coccoids in closely knit pairs measuring about $2{\cdot}8 \times 2{\cdot}3\mu$, and into "hay flora group (2)", comprising (a) large ($3{\cdot}2 - 5{\cdot}5 \times 2{\cdot}5\mu$), Gram-positive, thick, fairly square-ended rods; (b) very large ($<21{\cdot}5 \times 4{\cdot}0\mu$), Gram-negative, cigar-shaped rods; and (c) smaller (about $1{\cdot}0 \times 0{\cdot}8\mu$), Gram-negative rods occurring in fours or multiples of four. The flora which appeared to be characteristically associated with grain feeding were also divided into two groups. Group (1) comprised medium-sized ($1{\cdot}7 - 3{\cdot}4 \times 0{\cdot}8\mu$), comparatively thin, Gram-positive rods, resembling lactobacilli, and sometimes staining in a granular manner. Group (2) organisms were Gram-negative and bore a morphological resemblance to coliform bacteria. Photographs of these various types are given.

The ruminal inoculations appeared to assist in the establishment of the protozoa and in some, but not all, of the characteristic microflora.

Calves that received a diet of alfalfa hay and milk remained free from diarrhoea, but there was a fairly high incidence of scouring in calves the ration of which included grain, a commercial calf-starter grain ration in pellet form, or shavings and straw bedding.

II. The observations upon the variation of ruminal fauna and flora with diet, indicated in I, were extended. It is pointed out that extreme variations in the fauna and flora were more

frequent among calves of only a few weeks of age (given dry feeds on a free-choice basis) than among older calves on the same régime. The younger calves often limited themselves to a single foodstuff, and their total intake was limited.

Altogether 35 samples from 19 calves, varying from one to four and a half months of age, were examined. When alfalfa hay alone was fed, moderate numbers of protozoa and of the two types of "hay" organisms described in I were observed. On a ration comprising 3 parts of hay: 1 part of grain, masses of protozoa and fairly numerous "hay" organisms of both types were observed. On 1 part hay : 1 part grain there were similar concentrations of protozoa, somewhat limited numbers of "hay" organisms and a fairly numerous "grain" flora of both types. With rations preponderating in grain (3 parts grain : 1 part hay) there were limited numbers of protozoa, masses of "grain" organisms and no "hay" organisms. On an all-grain ration there were significant numbers of "grain" organisms only.
—ALASTAIR N. WORDEN.

CARTER, H. B., & HARDY, M. H. (1947.) **Studies in the biology of the skin and fleece of sheep. IV. The hair follicle group and its topographical variations in the skin of the Merino foetus.**—*Bull. Coun. sci. industr. Res. Aust.* No. 215. pp. 41. **476**

Regional differences in the development of the hair follicles and the composition of the hair follicle group in the skin of 20 Merino foetuses are described.

In the development of hair follicle groups the same general sequence of events occurred in nearly every body region studied, and there was some evidence of a main antero-posterior gradient in time of development. The main differences between regions were found to be in time of development and in the relative sizes and numbers of primary and secondary follicles. Rapid changes in the density of the follicle distribution were associated more closely with stages of development in the follicle group than with post-natal regional differences. Orderly trends in density such as a dorso-ventral gradient on the trunk and a proximo-distal gradient on the limbs were apparent only in the later foetuses.

The findings are compared with the very limited information available from other sources on hair follicle group development in the Merino and other breeds.—H. B. CARTER.

PRABHU, S. S., & AMBLE, V. N. (1946.) **Weaned versus unweaned—a statistical study of an experiment conducted on goats.**—*Indian J. vet. Sci.* **16.** 212–222. **477**

A statistical study was made on two similar groups of ten Barbari goats to test the effect of weaning on the lactation of the dam and the growth of kids.

In one group the kids were weaned at birth, in the other after the age of four months. Milk yields and the length of lactation and the weights of the kids over successive pregnancies were recorded over a period of five years.

The growth of kids given artificial feeding was as good as the growth in those receiving the dams' milk. The average total milk yield was higher and the lactation period longer in the first group.—S. SEN.

SHANER, R. F. (1949.) **Malformation of the atrio-ventricular endocardial cushions of the embryo pig and its relation to defects of the conus and truncus arteriosus.**—*Amer. J. Anat.* **84.** 431–455. [Author's summary copied *verbatim.*] **478**

The author has examined 15,000 pig embryos and found 35 abnormal hearts. In half of these the external malformations of the conus and great vessels were associated with malformations of the atrio-ventricular canal cushions within.

A review of the normal development shows that a defective formation of the atrio-ventricular cushions could affect the proper development of the conus and the great vessels.

Nine embryo pig hearts, of an age equivalent to the human fetus of the third month, are described in detail. Three show the great vessels of equal caliber, three show aortic stenosis, and three pulmonary stenosis.

One common cause underlies all three groups. The defective development of the atrio-ventricular canal cushions prevents the proper migration of the aortic orifice to the left ventricle. If the aorta and the pulmonary artery continue to receive an adequate blood supply, the vessels grow to normal caliber. Occasionally the endocardial tissue surrounds and constricts the aortic orifice and produces aortic stenosis. More often the pulmonary loses blood to the more favorably situated aorta, and is subject to compression in its exposed position. Stenosis of the pulmonary artery follows.

Stenosis of either vessel is the dwarfing or stunting of an embryonic vessel that has been deprived of the stimulus of an adequate blood supply. It is an abnormal example of a normal phenomenon in the development of the vascular system.

While a deviation of the conus septum is not impossible as the primary cause of stenosis, other hitherto unsuspected defects within the heart may produce the same results. They should be considered when postnatal hearts are interpreted.

PIZON, P. (1949.) Sensation visuelle probable du chat. [**Physiology of vision in the cat.**]—

Rev. Path. comp. **49.** 240–242. [English summary.] **479**

A detailed study of the cat's eye shows it to be a sphere 19 mm. in diameter. The lens has the same refractive index as the human eye, but is somewhat thicker. The focal length is 17·5 mm. and the optic centre 1·8 mm. behind the cornea. The far point of the eye is about 20 m. and the near point 10 cm., the amplitude of accommodation being 10 dioptres and the separating power 5 mm. at 20 m. Stereoscopic vision is not well developed, but when a cat requires to pounce it exaggerates stereoscopic parallax by movements of the head. The transparency of the cat's eye is 2·5 times greater than that of the human eye so that a cat can see in relatively poor light. Whilst the cat does not react to colours, its range of vision appears to extend over a greater wave-length band than that of the human eye.—J. A. NICHOLSON.

COBBLE, J. W., & RAGSDALE, A. C. (1949.) **The effect of increasing environmental temperatures on the composition of milk.**—*J. Dairy Sci.* **32.** 713. [Only abst. given, copied *verbatim.*] **480**

Changes in the composition of milk where cows are subjected to high environmental temperatures were studied on a group of ten cows in the Psychroenergetic Laboratory at the University of Missouri. Five cows were used as controls and five were subjected to various temperatures over a 5-mo. period. The temperature on the experimental cows, three Jerseys and two Holsteins, was increased systematically from 50 to 105° F. by 5 to 10° F. During the last 14 d. of the experiment the control cows were subjected to a rapid increase in temperature up to 100° F. Some 850 samples of milk were collected and determinations made for total solids, fat percentage, solids-not-fat, lactose, chloride and nitrogen.

Data from these studies indicate a rise in the fat percentage, total solids and chlorides with an increase in temperature above 80 to 90° F., varying with breed and individual. Solids-not-fat, lactose and nitrogen, to a lesser extent in the Jerseys, showed a downward trend at the same temperature levels. All constituents studied returned to approximately normal levels with a return to 60° F. reading.

In the rapid change of temperatures up to 100° F. over a 14-d. period, extreme increases were observed in the total solids, solids-not-fat, fat percentage, chlorides and nitrogen. Lactose dropped to a low level.

Results obtained in composition of milk indicate breed differences, as well as an individual difference in ability to withstand high environmental temperatures.

FRANÇOIS, A. (1946.) Recherche sur le comportement biochimique et physiologique de la vitamine A dans la secrétion lactée. **[Biochemical and physiological behaviour of vitamin A in milk.]**—*Lait.* **26.** 99–116. **481**

F. critically examined methods for the estimation of vitamin A and carotene in milk and colostrum. A modified antimony trichloride method was found to be most accurate and convenient. Carotene and vitamin A values for milk throughout the season, and for colostrum are given. Summer whole milk contained 350 μg. of carotene and 750 I.U. of vitamin A per l. Corresponding figures for winter milk were 50 μg. and 150 I.U. In summer, skim milk contained 58 μg. carotene and 57 I.U. vitamin A, and in winter 34 μg. and 20 I.U. The fat of skim milk although very small in amount contained more carotene and more vitamin A per g. than the fat of whole milk. Some evidence was obtained that carotene and vitamin A are closely associated with the protein-lipoid complexes of milk.—E. M. CRUICKSHANK.

ALTMAN, A. D. (1945.) **[Udder changes in lactating cows.]**—*Vestn. Zhivotnov.* No. 1. pp. 85–96. [Abst. in *Dairy Sci. Abstr.* **9.** 287. (1948), copied *verbatim.* Signed : A. T. C.] **482**

Udder growth during the last two months of pregnancy and during lactation was studied in adult cross-bred cows, predominantly Holmogors and Yaroslavs. Determinations of the udder capacity from the 15th day to the 90th day of lactation were made every 10 to 12 days on 18 cows. The udder capacity is defined as the internal volume of the alveoli, ducts and cisterns, the internal volume being obtained from the volume of milk which could be withdrawn from the udder when it was full of milk, *i.e.*, when lactose appeared in the urine. No significant change in udder capacity was observed, the average volume being 8·3 l. From this observation it is concluded that neither are new alveoli formed, nor do the existing alveoli increase in size during lactation.

Histological studies were carried out on the udders of 3 non-lactating cows 8 to 9 months pregnant, of 2 newly-calved cows, of 3 cows in the 20th to 30th day of lactation, of 2 non-pregnant cows in the 8th month of lactation, and of 3 cows 2 to 3 months pregnant and in the 5th to 7th month of lactation. These cows were 5 to 11 yr. old. Mammary tissue for sectioning was taken from the peripheral, central and cisternal regions of the udders. In each preparation the alveoli, cells, and mitoses were counted. The proportion of mitoses to the total number of cells and the average number of cells per section of alveolus were calculated. The major and minor axes of the nuclei were measured by an ocular micrometer. The nucleus was assumed to be a spheroid and its volume was calculated accordingly. [The formula as stated is, however,

incorrect.] On the further assumption that the alveoli are hollow spheres, an index of the number of cells per alveolus was obtained by squaring the number of cells per section of alveolus.

On the day of calving there was an average of 19·1 ± 0·4 cells per section of alveolus as compared with 13·4 ± 1·0 per section in the last two months of pregnancy. It is deduced that the number of cells per alveolus is doubled about the time of calving. The number of cells per alveolar section did not alter significantly in the subsequent stages of lactation.

Mitoses were most frequent in the udders of non-lactating cows 8 to 9 months pregnant (1 mitosis per 576 cells). In the other phases which were studied, mitoses were rarely noted (1 per 16,000 to 70,000 cells).

At parturition the mean volume of the nucleus was 21·6 ± 0·8 cubic units, by the first month of lactation the mean volume had increased to 58·9 ± 2·2 cubic units. The volume thereafter declined.

On the assumption that the nucleus : cytoplasm ratio of a cell is relatively constant, the volume of the cell was considered to be proportional to the volume of the nucleus. On this basis the relative size of the cellular mass of the alveoli was obtained by multiplying the volume of the nucleus by the index of the number of cells per alveolus. In the last two months of pregnancy the cellular mass equalled 5,549 cubic units, at parturition this had increased to 7,776 cubic units. This increase was mainly due to the increase in the number of cells per alveolus. In the first month of lactation the cellular mass had increased to 18,549 cubic units as a result of an increase in cell size.

On the assumption that mitosis lasts for 2 hr., it was calculated that 48 days were necessary for the formation of new alveoli in the udders of dry cows 8 to 9 months pregnant. In lactating animals mitosis is so rare that it is concluded that cell replacement probably takes place by amitotic division. The dry period before calving is therefore important to allow for the rapid regeneration of the secretory epithelium before the next lactation.

The formation of new cells in the mammary glands of 4 pregnant and 17 lactating rats was investigated by the colchicine technique. The greatest number of mitoses occurred in the glands of pregnant rats (1 mitosis per 385 ± 31·5 cells). In the first day of lactation there was 1 mitosis per 977·6 ± 23·0 cells, by the tenth day there was only 1 mitosis per 3,600 ± 135 cells. In the pregnant rat there was an average of 9·5 ± 0·13 cells per section of alveolus, on the first day of lactation this figure had increased to 11·0 ± 0·32 and by the 10th day of lactation to 15·5 ± 0·6. It is considered that the alveolus in the rat, in contrast to that of the cow, grows during lactation.

[This attempt to measure objectively the development of the lactating mammary gland is noteworthy, for seldom if ever before has this been done in the case of the cow. The method, however, of relating the number of cells per section of alveolus to the number per whole alveolus would appear to be of questionable validity since the alveoli are not spheres, as assumed, but are irregularly elongated pear-shaped objects, and in section these may be cut in any transverse, oblique or longitudinal plane.]

GREEN, H. N., STONER, H. B., & BIELSCHOWSKY, M. (1949.) **The effect of trauma on the pentose content of the plasma in animals.**—*J. Path. Bact.* **61.** 101–109. [Authors' summary copied *verbatim.*] **483**

The effect of various lethal forms of trauma on the plasma-pentose levels have been investigated in the rabbit and rat. In the rabbit, limb ischaemia is followed by an increase in the concentration of both the total pentose and its phosphorylated fraction. A similar increase occurs in the rat after limb ischaemia, direct muscle trauma and scalds. These changes, which are of the same order as those produced by the intramuscular injection of fatal doses of adenosine triphosphate, cannot be accounted for by the method of blood sampling or anaesthesia.

Trauma is usually accompanied by increased fragility of the red cell and the possibility that the excess pentose is derived from this cell following haemolysis is considered in the discussion. It is concluded that, with the possible exception of the changes after scalding in the rat, the red cells are not the main source of the excess pentose. Some evidence in favour of the main source being the damaged tissue is presented. The relationship of these results to other of our findings is discussed and it is concluded that trauma is accompanied by an increase in the concentration of nucleotide metabolites in the blood stream.

JACOX, R. F. (1949.) **Studies on the activation of a serum "prothrombin-converting factor".** —*J. clin. Invest.* **28.** 492–504. [Author's summary copied *verbatim.*] **484**

Preliminary investigations are reported which describe a method of activation of a prothrombin-converting substance ("prothrombin-converting factor") by adding thromboplastin to serum. The activated "prothrombin-converting factor" causes conversion of prothrombin in the virtual absence of calcium; slowly decreases in activity following liberation from serum by thromboplastin; can be reactivated again by adding more thromboplastin

to the inactive serum-thromboplastin mixture; and is unable to cause direct conversion of fibrinogen to fibrin.

Serum of dicumarol-treated patients, which is activated by thromboplastin, has a more sustained release of "prothrombin-converting factor". The activity of "prothrombin-converting factor," under these circumstances, increases as the level of plasma prothrombin falls. Conversely, a patient with cirrhosis of the liver, associated with an hemorrhagic disorder, was found to have a decrease of "prothrombin-converting factor" as well as a reduction of plasma prothrombin. On the basis of the experimental evidence outlined, a revision of the generally accepted theory of blood coagulation is proposed.

PORTER, K. R., & HAWN, C. VAN Z. (1949.) **Sequences in the formation of clots from purified bovine fibrinogen and thrombin: a study with the electron microscope.**—*J. exp. Med.* **90.** 225–232. [Authors' summary copied *verbatim.*] **485**

The observed sequences in the formation of clots from purified bovine fibrinogen and thrombin are described. Under the conditions of these experiments, it appears that fibrinogen molecules are polymerized by the action of thrombin to form needle-shaped, crystal-like protofibrils which then become aligned into fiber strands by lateral association. The integrity of the unit fibrils is maintained within the strand. A model of the fibrinogen molecule is proposed which may satisfy the reported physical constants, data from x-ray diffraction studies, and observations made upon electron micrographs.

MUSHETT, C. W., STERN, K. G., & SILBER, R. H. (1949.) **A haematologic and electrophoretic study on blood regeneration in dogs subjected to repeated phlebotomy.**—*Amer. J. med. Sci.* **218.** 58–64. [Authors' summary copied *verbatim.*] **486**

Repeated phlebotomy in adult dogs, maintained on diets containing 25 to 30% protein resulted in the development of a microcytic, hypochromic anemia. No differences, ascribable to the dietary regimen, were observed in the ability of the dogs to synthesize hemoglobin. After a single withdrawal of blood, hemodilution occurred within one hour. Serum protein levels were essentially normal 48 hours later but hematocrit values were still depressed. Throughout the course of bleeding, plasma protein production took precedence over hemoglobin production. The possibility exists that this condition may have been due, in part, to iron lack or faulty iron utilization. As a result of bleeding, an increase in total globulin and a decrease in albumin was observed in a dog on a purified diet supplemented with liver and in another fed a natural stock ration. The reverse effect occurred in a dog given a purified diet without liver. Electrophoretic studies revealed a relative decrease in gamma globulin and increases in the beta-1 and alpha-3 globulin fractions of the plasma in all 3 dogs following repeated removal of whole blood.

MARX, W., MARX, L., MESERVE, E. R., SHIMODA, F., & DEUEL, H. J., Jr. (1949.) **Effects of the administration of a vitamin E concentrate and of cholesterol and bile salt on the aorta of the rat.**—*Arch. Path.* **47.** 440–445. [Authors' summary copied *verbatim.*] **487**

The influence of vitamin E (alpha tocopherol) on cholesterol metabolism and the development of arteriosclerosis was investigated in the rat. Neither vitamin E deficiency nor an excess of a vitamin E concentrate modified blood or tissue cholesterol levels. Avitaminosis E caused fatty infiltration of the wall of the aorta, regardless of the cholesterol content of blood or diet. High doses of a vitamin E concentrate produced localized sclerosis and deposition of cholesterol in the aorta. These changes were prevented by high dietary cholesterol and bile salt.

HORVATH, S. M., & HOLLANDER, J. L. (1949.) **Intra-articular temperature as a measure of joint reaction.**—*J. clin. Invest.* **28.** 469–473. [Authors' summary copied *verbatim.*] **488**

A method for the determination of the temperature of the articular cavity has been developed which appears to have a practical use both to measure the degree of inflammation in the joint and to determine the effect of external influences on joints. Intra-articular temperatures correlated somewhat more closely than the surface temperatures over the joint with the clinical activity of rheumatoid arthritis.

The joint temperatures in degenerative joint disease were higher than anticipated from relative clinical activity. This might be related to greater joint friction effects and to retarded cooling. The joint temperature fell when hot packs were applied over the joint, and rose with the application of cold packs. The magnitude of these responses was affected by seasonal influences being greater in the winter than the summer.

LEVIN, L. (1949.) **The occurrence of α-estradiol in the urine of stallions; its identification and isolation.**—*J. biol. Chem.* **178.** 229–240. **489**

A systematic investigation of a number of specimens of stallions' urine was made to determine the chemical nature of the oestrogens present. Extracts were made both from fresh samples and samples which had been allowed to "age" for several months. Six fresh samples were found to

contain 5,500–150,000 I.U. oestrogen per l., the non-ketonic portion of the oestrogens accounting for 45–60% of the total activity in five samples and for 93% in the sixth sample. The ketonic fraction was found to be oestrone (2·9–43·6 mg. per l.) while the non-ketonic fraction was α-oestradiol (0·4–16·8 mg. per l.). No oestriol was found. Stallions' urine is therefore the richest natural source of α-oestradiol, not excluding follicular fluid or ovarian tissue. When urine was allowed to "age" variable but appreciable losses of oestradiol occurred with coincident but smaller changes in the oestrone content; the chemistry of these changes is discussed.—ALFRED T. COWIE.

KONEFF, A. A., NICHOLS, C. W., Jr., WOLFF, J., & CHAIKOFF, I. L. (1949.) **The fetal bovine thyroid: morphogenesis as related to iodine accumulation.**—*Endocrinology.* **45.** 242–249. [Authors' summary copied *verbatim.*] **490**

Thyroxine-like and other organically bound iodine compounds appear in the fetal calf thyroid between the 53d. and 70th days, a time prior to the appearance of histologically detectable intracellular colloid or follicle formation, which takes place at 75–88 days. Since the livers of fetuses aged 62–70 days contain practically no iodine, the presence of these organic iodine compounds was considered a manifestation of iodine storage by the gland.

From the 75th to 118th day, the predominating features of the developing thyroid were the appearance of colloid and differentiation of the parenchyma without a pronounced increase in the iodine content of the gland.

Between the fourth and seventh month, gradual development of the fetal thyroid gland was accompanied by a steady increase in it organic iodine content.

An appreciable increase in organic iodine content occurred near term, and was accompanied by definite histological manifestations of increased functional activity of the follicular epithelium.

GORDON, I. (1949.) **The origin of placental trophoblast and the function of placental gonadotrophin.**—*Lancet.* **256.** 807–814. **491**

The placental trophoblast in higher animals has, perhaps, been too readily accepted by embryologists as being of foetal origin. G. advanced, however, some attractive arguments indicating that an invasive trophoblast is of maternal and not foetal origin. The main facts leading to this conclusion are that a trophoblast can develop in the absence of an embryo, it can live on after an embryo has died, it can be transplanted into maternal tissue and there is good evidence that it produces maternal hormones such as oestrogens, progesterone and androgens.

In searching for a likely maternal origin, G. points out that the follicular cells surrounding the ovum are known to undergo hyperplasia under the stimulus of gonadotropin and thus could develop into trophoblast. It is known, however, that in some species, *e.g.* the rabbit, the cumulus cells are completely desquamated after ovulation. Their fate has remained uncertain, but it may be supposed that some of these cells and the fertilized ovum meet again *in utero.* The need for gonadotropin in human pregnancy is thus accounted for, but it could not be produced by the chorion and must be of uterine origin. Much further work will be necessary before these ideas can be altogether accepted, but light is thrown on an extremely difficult problem.—J. A. NICHOLSON.

See also absts. **440** (lactation); **444** (vitamin A in milk and organs); **547** (book, physiology).

PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

ANON. (1948.) Etats-unis (U.S.A.) Méthodes uniformes et règles pour l'établissement et l'entretien des troupeaux de bétail reconnus exempts de tuberculose, et des aires accréditées modifiées. **[Methods and regulations concerning TB. free cattle and modified accredited areas in the U.S.A.]**—*Bull. Off. internat. Epiz.* **29.** 82–87. **492**

This is in reality merely a recapitulation of the U.S.A. regulations (1943) for their accredited herds and areas.—D. S. RABAGLIATI.

SOUTO, A. B., & DA SILVA, M. M. (1947.) Investigações em contagens comparativas entre a espuma e o leite respectivo. **[Comparative (bacterial) content of milk and milk foam.]**—*Hosp., Rio de J.* **31.** 547–553. [Abst. in *Bull. Hyg., Lond.* **24.** 270. (1949), copied *verbatim.* Signed: H. HAROLD SCOTT.] **493**

[An interesting study.] Investigation has shown that the temperature of the skim or froth of milk when pasteurized is usually 2·8°C. below that of the bulk of the milk, and may be as much as 6°C. Many organisms may thus be still viable in the foam and may recontaminate the pasteurized milk, and also the scum may protect the milk organisms from destruction.

The authors have made bacterial counts of samples of raw milk and skim and of the same after pasteurization, nearly 300 examinations of 74 samples. They counted over 5 million "living and viable" organisms per cc. in 66 samples of the skim after pasteurization of the milk, whereas

in the milk itself the number was about one-tenth of this (574,214), and of the former 47 of the 74 samples contained *Bact. coli*, in one-fourth of them in as high a dilution as 1 : 100,000. Seeing that about half of the samples of pasteurized milk also contained *Bact. coli*, it is probable, nay almost certain, say the authors, that recontamination of the milk took place from the skim ; in other words, the pasteurization was inadequate. They mention the possibility of there being thermo-resistant strains of *Bact. coli*, but this does not seem a very satisfying explanation, and protection by the froth or recontamination from it is more likely to account for the presence of this organism in the milk.

LESSER, M. A. (1948.) **Dairy cleaners.**—*Soap & Sanit. Chem.* **24.** 40–43 ; 151 & 153. **494**

The cleaning of dairy equipment has become one of the most important operations of the milk processing industry. In a well-organized plant, the cleaning should occupy 30–40 % of the time spent in daily operations. It is emphasized that dairy equipment should be cleaned before attempts are made to sterilize it.

The composition of a detergent for cleaning dairy equipment is determined by the conditions under which it is to be used and the kind of work it is expected to do. A satisfactory product is one that (a) softens the water ; (b) prevents precipitation of mineral salts dissolved in water which cause scale formation ; (c) increases the wetting ability of the water ; (d) dissolves or softens the milk residues so that they can be removed ; (e) does not corrode the metal surfaces of the equipment ; (f) does not attack the hands if it is used in manual cleaning ; (g) is non-toxic ; (h) does not encourage the development of off-flavours in dairy products and (i) is economical to use.

Although as yet there is no universal detergent for cleaning dairy equipment, a number of formulae are given including both alkaline and acid cleaners to meet special conditions. The incorporation of polyphosphates and surface-active agents in these mixtures is discussed and a standard procedure, where an alkaline cleaner is used on three successive days and an acid cleaner substituted on the fourth day, is recommended.

—W. MOORE.

JEPSEN, A. (1947.) **Bacteriology of pork, microbial contamination acquired in the meatworks.**—*K. VetHøjsk. Aarsskr.* Denmark. pp. 40–85. [In English. Author's summary slightly amended.] **495**

By means of bacterial counts, two series of examinations were made to elucidate the surface infection of live pigs and pig carcasses during the slaughter floor operations as these are carried out at the Danish bacon factories. It proved that scalding, scraping, and singeing reduces the surface contamination by non-spore-bearing bacteria on the skin to less than one per cent of the initial infection on the skin surface of the live animal ; but during the removal of the organs, and the further treatment of the carcasses, the surface contamination was again increased, though only to the extent that the surface contamination on the finished carcasses amounts to 1–3 per cent of the initial contamination. The contamination was greater on the skin side than on the flesh side. A considerable proportion of the non-spore-bearing surface flora consisted of cold-resisting bacteria. The bacterial count at 2°C. was about 5–30 per cent of the total number of bacteria. The anaerobic spore-bearing bacteria (*Clostridium*) are less affected by the slaughter floor treatment, and in completed pig carcasses these bacteria were shown to be constant in not inconsiderable numbers.

On the basis of studies of the literature and the experience gained, an account is given of the microbiological conditions connected with slaughtering in general. Various sources of microbial contamination in the meat works (scalding-water, instruments, rinsing water, etc.) were examined.

The composition of the bacterial flora on freshly slaughtered pork was examined by the determination of 239 strains of non-spore-forming bacteria and 67 strains of spore-forming bacteria isolated from pig carcasses during slaughter. The following genera and species were established : *Micrococcus* + *Sarcina* + *Staphylococcus*, *Achromobacter*, *Flavobacterium*, *Pseudomonas*, *Proteus*, *Escherichia - aerobacter*, *Alcaligenes*, *Subtilis-mesentericus*, *Clostridium sporogenes*, *Cl. bifermentans*, *Cl. cochlearium*, *Cl. perfringens*, *Cl. butyricum*, *Cl. oedematiens*, *Cl. septicum*, *Cl. multifermentans*. Some of the isolated bacteria were examined for ability to propagate at cold-storage temperature and tolerate salt, and the importance of the various species to the spoilage and decomposition of meat and meat products is discussed in the light of their physiological properties.

Indol-positive *Escherichia coli* (faecal type) were not established in the surface flora of freshly slaughtered carcasses. Experiments were carried out which showed that the skin of live pigs quickly eliminates coli bacteria after artificial infection, whereas natural skin bacteria (micrococci) remain viable for a longer period.

Examination of the surface infection of pig carcasses that had been kept in a frozen state for varying periods revealed materially the same bacterial flora as in the freshly slaughtered pork.

ANON. (1947.) La "Commissione per la

Veterinaria" al Consiglio Nazionale delle Ricerche. **[Visit of the "veterinary commission" to the Italian National Council for Research.]**—*Zooprofilassi.* **2.** No. 6. pp. 15–16. **496**

A programme of work was drawn up between a committee of veterinarians and the National Council for Research. This included collaboration between the latter and the veterinary profession; the establishment of a central veterinary library; the improvement of reports on enzootics and the standardization of methods of diagnosis and control. Centres of study were to be opened at Milan for artificial insemination and animal nutrition, and at Perugia for poultry disease.

—R. MACGREGOR.

POPOVNENKO, N. I. (1946.) **[Post-war re-establishment of veterinary work (in the Ukraine).]**—*Veterinariya, Moscow.* **23.** No. 10–11. pp. 4–5. **497**

The pre-war administration of a district in the Ukraine consisted of seven veterinary centres with six ambulances, and each served 3–9 "farms" with a maximum radius of 12 km. from any one veterinary centre. There were altogether two veterinarians, 12 assistant veterinarians (feldshers) and 45 other trained staff to the particular district here described.

During the German occupation everything was destroyed and certain infectious diseases were introduced. P. describes the difficulties encountered in re-establishing the stations, training new staff and controlling the infections.—F. A. A.

WILSON, W. L. (1948.) **Medical aspects of government services in time of national emergency.**—*Bull. U.S. Army med. Dep.* **8.** 493–498. **498**

An extract from an address given to a meeting of the American Medical Association Council on the national emergency medical service. Veterinary problems were listed as follows: "insufficient numbers of veterinarians to continue minimum essential functions; the continuation of veterinary education in wartime; the possibility of attack against animal populations, making the civilian veterinarians more important than the military to our actual survival; and food inspections complicated by radiation, shortages, rationing, and conservation."

See also absts. **353-355** (vaccine institute); **372** (in Nigeria); **386** (abattoirs); **532** (report, S. Africa); **549** (book, bacteriology of milk).

LIVESTOCK HYGIENE

MOORE, E. N. (1947.) **The use of propylene glycol as an incubator fumigant.**—*J. Amer. vet. med. Ass.* **111.** 116–122. **499**

The literature is briefly reviewed relating to incubator fumigation and air sterilization by means of aerosols. These preliminary studies indicate that there is a marked variation in the effectiveness of glycol vapour in different incubators.

Triethylene glycol was unsatisfactory as it condensed before effective concentration could be reached. Propylene glycol was not as efficient as formalin. Neither methylene glycol nor propylene glycol appeared to have any harmful effect on the chicks.—D. LUKE.

LENSEN, S. G., RHIAN, M., STEBBINS, M. R., BACKUS, R. C., & PETERSON, C. E. (1949.) **Inactivation of partially purified poliomyelitis virus in water by chlorination. III. Experiments with natural waters.**—*Amer. J. publ. Hlth.* **39.** 1120–1128. [Authors' summary copied *verbatim.*] **500**

The inactivation of partially purified poliomyelitis virus (mouse adapted Lansing strain) in natural waters was studied by chlorination of 100 ml. portions of water to which virus was added in final concentrations of 0·25 and 0·5 per cent. Samples of three different lake waters, two river waters, and one lime-treated well water were used for the experiments.

In samples of natural waters having a pH range of 7·9–8·3, the virus was consistently inactivated within 10 minutes in presence of 0·05 p.p.m. residual free chlorine at the end of this contact period. In many instances, but not always, the virus was inactivated by still smaller amounts of free residual chlorine. In experiments at a higher pH range (pH 10·0–11·25), 0·1 to 0·15 p.p.m. residual free chlorine were necessary to achieve the same results.

JOHNSTONE-WALLACE, D. B. (1948.) **Pasture management and animal behaviour.**—*J. Fmrs' Cl., Lond.* Part 1. pp. 1–13. **501**

A broad discussion on pasture management with a few general references to animal behaviour. It was found that greatest yields of grass of high digestibility were obtained by cutting swards of an average height of 4 in. to within one-half in. of the ground. Guinea pigs were found to be capable of dealing with the high nitrogen content of this herbage. The laxative effect of luxuriant spring herbage on cattle and the problem of bloat are mentioned. Observations on the behaviour of animals at pasture are discussed.—E. J. H. F.

See also absts. **536** (report on dairying); **544** (poultry).

REPRODUCTION AND REPRODUCTIVE DISORDERS

BEATTIE, H. E. R. (1947.) **This question of artificial insemination.**—*Yearb. Inst. Insp. Stk N.S.W.* 1947. pp. 61–65. **502**

The experience of the artificial insemination centre at the Veterinary Research Station, Glenfield, is described. Known calvings total 265 and an approximately equal number of cows were pregnant. In 65% of cases the cows conceived to one insemination and less than 10% required more than two inseminations. The technique for the collection of the semen and for insemination is described. The treatment adopted for cases of sterility is described and some useful hints are given for the early diagnosis of pregnancy.

—D. F. STEWART.

HINDMARSH, W. L. (1946.) **The application of artificial insemination in dairy herds in N.S.W. as affected by uterine disease.**—*Yearb. Inst. Insp. Stk N.S.W.* 1946. pp. 49–52. **503**

The experience gained in establishing an insemination service is described. Because many of the cows offered for insemination are infertile it is essential to provide a service for the treatment of sterility in conjunction with the insemination service. For this reason insemination should be carried out by veterinarians. The technique used is described. Successful fertilization with one insemination can be obtained in about 90% of normal cows. Owing to the number of infertile cows, only 60% of all those inseminated were fertilized with one insemination.—D. F. STEWART.

HANCOCK, J. L. (1948.) **Notes on oestrus, ovulation and pregnancy in the mare.**—*Vet. Rec.* **60.** 679–682. **504**

The reproductive cycles in 28 mares maintained for the collection of pregnant mares' serum were investigated in detail. Data relating to the duration of oestrus and dioestrus and the time of ovulation are given. The mean length of oestrus was found to be 5·3 days with a range of 1–9 days. Ovulation occurred most frequently within 48 hours of the termination of oestrus. In 55 ovulations, the distribution between left and right ovaries was 36 to 19. Irregularities of the oestrous cycle and their hormonal control are discussed. Foetal migration occurred in 8 of 20 mares and in every case was from left to right horn. Death of the foetus and resorption before the 70th day occurred in 2 of 19 single and 3 of 5 twin pregnancies. H. discusses his observations in relation to those of other investigators.—A. T. COWIE.

EROFEEVA, N. N., & ZAVADOVSKIĬ, M. M. (1947.) **[A new method of early pregnancy diagnosis in the mare and determination of the gonadotropic activity of pregnant mare serum (PMS).]**—*Bjull. eksp. Biol. Med.* **23.** 59–62. [Abst. in *Anim. Breed. Abstr.* **16.** 208. (1948), copied *verbatim.*] **505**

Twenty immature 30–40 g. rats were injected with 1–160 M.U. of PMS and killed 24 hrs. later. There was hyperaemia of the ovaries of all animals injected with at least 15 M.U. A further 68 tests were carried out with 1 cm.^{3} fresh serum and confirmed by a mouse test in which a single injection was made with diluted serum and the animals killed 76 hrs. later. Pregnancy was confirmed in the 26 samples producing bright pink and the 16 producing red hyperaemia. Of the 18 samples producing pink hyperaemia 16 were confirmed as indicating pregnancy and 2 were doubtful. No hyperaemia after the injection of the 8 samples was proved to indicate no pregnancy in 7, but 1 of the samples showed increase gonadotropic content when tested in mice. The degree of hyperaemia cannot be taken as a standard for the gonadotropic activity of the serum, but a positive reaction indicates at least 60,000 M.U. gonadotropin per litre. The test was found to be equally satisfactory using mice and injecting 0·5 cm.^{3} PMS.

SZUMOWSKI, S. (1948.) Etudes sur quelques propriétés physiques du sperme de taureau. **[The physical properties of bull semen.]**—*Rec. Méd. vét.* **124.** 124–136. **506**

S. reviews the literature and discusses his observations dealing with 98 semen samples obtained from two bulls which were used solely for this experiment. Collections were made three times weekly by usual artificial insemination technique. Fresh semen was examined for motility, density, pH, methylene blue reduction, spermatozoa count, sedimentation rate, viscosity (of whole semen and of seminal " plasma "), and the persistence of motility during storage. S. emphasizes the importance of viscosity measurements and discusses the contributory factors. Values for semen were higher than for whole blood and ranged from 2–10 times that of water. S. relates viscosity to his other measurements statistically and finds a significant relationship between viscosity of whole semen and (a) motility of fresh spermatozoa ; (b) number of spermatozoa in unit volume ; (c) number of spermatozoa in whole ejaculate ; (d) pH ; and (e) reducing power for methylene blue. No significant relationship is established between viscosity of whole semen and (a) volume of ejaculate ; (b) persistence of motility during storage ; and (c) viscosity of seminal " plasma ".

The implications of the findings are discussed in relation to (a) metabolism, (b) diluents, (c) degeneration during storage and (d) the judgment

of potentialities of fresh semen. S. considers that viscosity and pH measurements of fresh semen give very good indication of its value.—R. J. F.

BRANTON, C., NEWSOM, M. H., & PATRICK, T. E. (1949.) **Diluting bull semen on the basis of numbers of spermatozoa rather than by volume.** —*J. Dairy Sci.* **32.** 721–722. [Only abst. given, copied *verbatim.*] **507**

This report deals with a study of diluting bull semen to contain 16, 12, 8, 6 and 4 million spermatozoa/ml. regardless of the numbers of spermatozoa in the undiluted semen samples. Fifty ejaculates from 10 bulls, 6 of them Jerseys, 2 Holsteins, and 2 Guernseys, were diluted with egg yolk-citrate-sulfanilamide and used in routine breeding. The experimental design employed consisted of two 5 × 5 Latin squares. Results on the basis of 30 to 60 day non-returns to 1,895 first services showed, 62·8, 64·0, 66·8, 58·0 and 63·5% non-returns for semen diluted to contain 16, 12, 8, 6 and 4 million spermatozoa/ml., respectively. When tested statistically, these fertility levels were not significantly different.

PINO, N., & IOPPOLO, E. (1948.) Ricerche biometrico-statistiche su quattordici indici zoometrici in vacche Meticce Svitto-Modicane. **[Biometric-statistical studies on the fourteen zoometric indices in Brown Swiss × Modicana cattle.]**—*Zootec. Vet., Milan.* **3.** 244–257. **508**

Eighty cross-bred Brown Swiss-Modicana cattle (the latter an indigenous Sicilian breed) were selected for homogeneity of coat colour. Eleven measurements of body, head and cannon of each were used in calculating 14 indices. The results were arranged in four groups according to age, a statistical analysis being carried out of figures in each group. Tables are provided giving relative data.

The authors conclude that the variation in the majority of these indices is sufficiently small to indicate homogeneous blending of the conformations of the parent breeds.—W. PLOWRIGHT.

HAYS, F. A. (1945.) **Isolating gene E′ for early sexual maturity.**—*Amer. Nat.* **79.** 372–377. **509**

By crossing early and late maturing poultry strains H. demonstrated a cumulative effect between sex linked gene E and autozomal gene E′. Birds with both genes matured early, those with E or E′ alone matured later, those without either E or E′ matured latest.

Late maturing Rhode Island Red cocks were mated with early maturing Barred Plymouth Rock hens. By marking the sex chromosomes with such dominant genes as barring and silver it was possible to eliminate the sex linked gene E for early sexual maturity in the resulting hybrids. After elimination of the sex linked gene a homozygous strain for autosomal gene E′ only was bred. The characteristics and maturing ages of six generations thus obtained are recorded.—E. G.

FRASER, C. F. (1949.) **The effect of vitamin A on hereditary hyperkeratosis in the mouse.**—*Canad. J. Res.* Sect. D. **27.** 179–185. [Author's abst. copied *verbatim.*] **510**

The formation of cysts in the sebaceous glands and follicle ends that occurs in "rhino" mice can be suppressed by massive vitamin A therapy. The significance of this finding is discussed in relation to the mode of action of the rhino gene.

CASADY, R. B., COLE, H. H., & HART, G. H. (1949.) **Factors modifying the excretion of fecal androgens in the cow.**—*J. Dairy Sci.* **32.** 265–277. **511**

Factors influencing the faecal excretion of androgens in cows were investigated using the comb growth in white Leghorn cockerels as the indicator of androgenic activity. Dried samples of the faeces were incorporated into the chicks' diet. The 24-hour excretion of androgens was observed to be increased 3–4 times when the cows were fed on a roughage diet instead of concentrates alone. The faeces from six cows with cystic ovaries contained less androgen than normal; two samples contained none. Bilateral ovariectomy of a cow produced no significant change in the androgen excretion. Injections of pregnant mares' serum gonadotropin in one cow increased on two occasions the androgen excretion; in another animal the androgen output was apparently decreased. Androgen excretion did not fall after unilateral adrenalectomy of an ovariectomized cow, there being in fact an increase in excretion; this was considered to be caused by hyperactivity of the remaining adrenal as a result of operative shock and stress.—ALFRED T. COWIE.

CHAPMAN, D. G., HANSON, A. A., COMMON, R. H., & MAW, W. A. (1949.) **The effect of gonadal hormones on liver nucleic acids in the immature pullet.**—*Canad. J. Res.* Sect. D. **27.** 200–206. [Authors' abst. copied *verbatim.*] **512**

The ribonucleic acid, desoxyribonucleic acid, and the ratio of ribonucleic acid to desoxyribonucleic acid in the liver of immature pullets treated with 4·5 mgm. testosterone propionate over a 12-day period were all increased when this treatment was supplemented by treatment with estrogen. The possible significance of these effects in relation to other effects of similar gonadal hormone treatments is discussed.

TEUNISSEN, G. H. B. (1946.) Steriliteit bij stieren. **[Sterility in bulls.]**—*Tijdschr. Diergeneesk.* **71.** 595–608. [English summary.] **513**

T. reports on an examination of 65 bulls for

sterility. In 16 of the bulls the semen was normal and they were accepted as fertile. Twelve of them originated from establishments where sterility was present. The bull from a farm where *Trichomonas* infection existed was found to be healthy; one bull was affected with balanopostitis, and had been lame, in another a myectomy of the retractor penis had been carried out and another had been newly purchased and the owner requested an examination. Of the 49 other bulls, 32 were between one and two years old and the remainder from two to ten years. The abnormalities encountered in these animals were: hypoplasia, degeneration, inflammation, fibrosis of the testicle and inflammation of the accessory sexual organs. Forty-five were affected with hypoplasia and degeneration of the testes. Hypoplasia was detected in the majority of the bulls under two years; some had degenerative changes. The older animals were affected with degenerative changes resulting from such diseases as septicaemic conditions; some had had several attacks of either foot and mouth disease, enteritis, or an inflammatory process of one testis prior to the onset of sterility. Clinical examinations revealed few abnormalities. Microscopic examination of the semen was carried out and the bulls were grouped according to the number of spermatozoa per ml. In the first group (0-100 million) the volume of semen per ejaculate varied from one half to six ml., was watery, thin and of abnormal clear colour; four animals yielded hardly any spermatozoa; abnormal spermatozoa amounted to less than 17% in two animals and 17–76% in the remaining eight. In the second group (100–200 million spermatozoa) there were four animals. The semen was white to yellowish in colour and was either watery or of moderate viscosity. Abnormal spermatozoa amounted to 17% in one animal and 17–50% in the other three. The third group (more than 200 million spermatozoa) contained 27 animals. The amount of semen varied from 1–5·5 ml. In 14 animals the amount of spermatozoa per ml. varied greatly from time to time and was often much below the average. In seven animals in which there were satisfactory numbers of spermatozoa per ml. of semen motility was poor. In the other six animals motility and number of spermatozoa were always satisfactory. Inflammatory processes may involve either the testes or accessory sexual glands. Two animals were affected with a unilateral orchitis—one of tuberculous origin and the other resulting from *Brucella abortus* infection.

Two animals had inflammation of the accessory sexual glands. In the one case the seminal vesicles were hard and nodular while the other exhibited a thickening of the head of the right epididymis. T. reports on the characters of the semen observed in the four last-mentioned animals.

—P. L. le Roux.

Hatch, R. D., Feenstra, E. S., & Jennings, L. F. (1949.) **A bacteriologic survey of the reproductive tract of infertile cows.**—*J. Amer. vet. med. Ass.* **114.** 131–133. **514**

The authors report on a preliminary investigation into the cervical and vaginal flora of an unspecified number of dairy cows originating from various sources and which had remained refractory to repeated artificial insemination, and some of which had then developed a purulent metritis.

Leaving specific causes of infertility (such as brucellosis, trichomoniasis and vibrionic infections) out of the survey, and also disregarding those organisms which were not identified, they found that bacterial infection, either clinically apparent or not apparent, may be blamed for many instances of otherwise inexplicable infertility.

Results of a concurrent study of several samples of semen led the authors to emphasize the need for using only healthy bulls from which semen should be collected with sanitary precautions and stored under optimum conditions.

—G. P. Marshall.

Hungerford, T. G. (1946.) **Treatment of sterility.**—*Yearb. Inst. Insp. Stk N.S.W.* 1946. pp. 53–54. **515**

A routine treatment for sterility is described. The ovaries are examined *per rectum* and any cysts or corpora lutea expressed. An aqueous solution of iodine is injected into the uterus and 30 mg. of stilboestrol injected intramuscularly. It is claimed that after one treatment 70% of cows become pregnant after service.—D. F. Stewart.

Bardoulat. (1949.) Traitement de la stérilité de la vache par implantation d'ovaires. [**Treatment of sterility in cows by subcutaneous implantation of ovaries.**]—*Bull. Acad. vét. Fr.* **22.** 51–55. **516**

Treatment of frigidity in the cow by implantation of whole ovary gives results comparable with those obtained by oestrogen administration. Results are sometimes slow to appear. Ovaries to be used for implantation may be kept several months without losing their effectiveness. The implant may act through its folliculin or prehormonal substances. The resultant oestrus, unlike that provoked by oestrogens, is nearly always followed by pregnancy to first service. Twenty-two case-reports are given.—W. R. Bett.

Hutt, F. B., & Frost, J. N. (1948.) **Hereditary epithelial defects in Ayrshire cattle.**—*J. Hered.* **39.** 131–137. **517**

Four Ayrshire calves, three heifers and a bull, born in a grading-up herd in a six-month period, had raw areas on the knees and all four fetlock

joints and, to a lesser degree, on the muzzle. One had lesions on the inner surface of the ears. Three were kept for only two or three weeks, but the fourth was kept alive for three and a half months, and then killed as it did not thrive. This calf had an extensive lesion on the under side of the tongue without normal mucosa, and on P.M. examination a similar lesion half an inch wide running down the oesophagus was revealed.

The four calves were sired by a pedigree bull out of cows which were all sired by another pedigree bull which had common ancestors with the first. Extended pedigrees of both bulls are given. Similar matings produced 26 normal calves. If both bulls were heterozygous for a recessive autosomal gene for epithelial defects a 7 : 1 ratio in the progeny of the second sire was expected, and the ratio of 26 : 4 obtained is very close to it. The possibility that the cows producing the four abnormal calves could have received the causative gene from their dams was eliminated.

A comparison between this abnormality and similar ones in Holstein-Friesians and Jerseys is considered, and the authors emphasize the importance of avoiding in artificial insemination the use of bulls heterozygous for this defect.

—J. O. L. King.

Nadel, E. M. (1949.) **Fibroids in a guinea pig (family 13) after partial castration.**—*J. Nat. Cancer Inst.* **9.** 271–275. [Author's summary and conclusions slightly amended.] **518**

A 6-month-old female guinea pig (family 13) developed multiple fibroids in the uterus and small intestine following partial castration. The single remaining ovarian fragment on the right was found to be encased in fat and fibrous tissue. It showed normal and degenerated follicles but no corpora lutea and no ripe follicles. It is suggested that peri-ovarian adhesions may have prevented follicular rupture and that the hyperestrinism developing consequent to partial castration, unopposed by corpus luteum hormone, ultimately resulted in the formation of multiple fibroids.

See also absts. **276** (congenital TB.); **531** (report on dairying).

Hays, F. A. (1949.) **Mortality rate in relation to egg production.**—*Poult. Sci.* **28.** 707–712. [Author's summary copied *verbatim.*] **519**

The relation of mortality rate over a ten-year period to first-year egg production was examined in 297 families of Rhode Island Reds. A total of 7,059 chicks was hatched, 3,246 pullets were included for the age period from eight weeks to six months, and 2,863 pullets were placed in the laying houses.

Three conclusions were drawn from this study: (1) High mortality in both sexes to the age of eight weeks was associated with superior production of surviving sisters in their first laying year. (2) High mortality in families of pullets between the ages of eight weeks and six months was associated with superior first-year records of their sisters that survived. (3) Mortality rate by families in the laying house during the first year had no relation to production of survivors.

ZOOTECHNY

Lee, D. H. K., & Phillips, R. W. (1948.) **Assessment of the adaptability of livestock to climatic stress.**—*J. Anim. Sci.* **7.** 391–425. **520**

This is an extremely helpful review, the keynote of which is an attempt to assess the bearing of the present state of physiological knowledge on the practical problem of developing breeds of livestock adapted to varying conditions of climatic stress. It is in two main sections, firstly the effects of climatic stress upon general bodily functions and secondly methods for studying reactions of animals to environmental stresses.

Tables are freely used to clarify the various problems, a particularly useful one being table 9 which lists the relationship of animal characteristics to adaptation to climatic stress, grouping factors concerned with body form, metabolic rate and thermo-regulating mechanisms. Table 10 which lists the effects of climatic conditions upon the animal characteristics is also a most useful aid. The value of the paper is enhanced by a good list of references.—M. C.

Brody, S. (1949.) **Reactions of dairy cows to higher temperatures.** [Abst. in *J. Dairy Sci.* **32.** 713, copied *verbatim.*] **521**

The lowest temperature at which cows begin to show decline in milk production and feed consumption and rise in rectal temperature is between 70 and 85°F., varying with body size and milk-yield level—the greater the body size and milk-yield the lower this "critical temperature." The highest temperature used was 105°F., when chamber and skin temperature met, obviously an important biological constant; the rectal temperature then was between 106°F. (Jerseys) and 108°F. (Holsteins); milk production and feed consumption then virtually ceased.

Respiration rate increased in "acclimatized" cows from an initial 25/min. at 50°F. to maxima of 90 in Holsteins at 95°F. and 130 in Jerseys at 105°F.; in "unacclimatized" cows the maximal respiration rates of 118 in Holsteins and 155 in Jerseys were reached at 95°F.

Rectal temperature began to rise earlier (a

70°F.) and the rate of rise was steeper in the larger cows; its rise was least in cows with the greatest rise in respiration rate; its rise was least in cows that drank the most water. One cow increased her water consumption (with corresponding increase in urine output) from 10 gal. at 50°F. to over 45 gal. at 100°F.

A sharp rise (100%) in blood creatinine was found. A decline in blood cholesterol resulted. A decline (40%) in heat production occurred with increasing temperature above 80°F.

McDowell, R. E., & Hilder, R. A. (1949.) **Factors affecting heat tolerance of dairy cattle.** [Abst. in *J. Dairy Sci.* **32.** 712, copied *verbatim.*] **522**

Studies have been conducted under controlled environmental temperature conditions with Holstein cows at Beltsville to determine the effect of stage of lactation and plane of nutrition on heat tolerance. In comparing dry cows and lactating cows at 65°F., there was no difference in body temperature between the two groups. At air temperatures of 90 and 100°F., there was little change in the body temperature of the dry cows, but there was a definite increase in body temperature in the lactating cow group. Greatest rises in body temperature are associated with higher feed intake at high environmental temperatures in both dry and lactating cows.

In these studies respiratory rate tended to parallel environmental temperature in all groups. Environmental temperature appeared to have no direct effect on pulse rate.

Hilder, R. A., & McDowell, R. E. (1949.) **The comparative heat tolerance of Red Sindhi × Jersey and other breeds of dairy calves.**—[Abst. in *J. Dairy Sci.* **32.** 712–713, copied *verbatim.*] **523**

The effect of high environmental temperatures on body temperature, respiratory rate and heart rate have been studied on four groups of calves: Red Sindhi × Jersey crossbreds, purebred Jersey, purebred Holstein and crossbreds of various combinations of European breeds. Part of the studies were carried out under natural climatic conditions at Beltsville during the summer of 1947, and part were done in a room in which air temperature was controlled. In their ability to maintain normal body temperature, the groups rank as follows: Red Sindhi × Jersey, purebred Jersey, crossbreds of European breeds, and purebred Holstein. The difference between the Red Sindhi × Jersey group and the purebred Jersey group was slight except during prolonged exposure to high environmental temperature. The Red Sindhi × Jersey group definitely was lower than the other groups in respiratory rate. In these studies environmental temperature appeared to have no direct effect on heart rate.

See also abts. **518** (castration); **538** (report on dairying).

Heitman, H., Jr., Kelly, C. F., & Hughes, E. H. (1949.) **California psychometric chamber for livestock environmental studies.**—*J. Anim. Sci.* **8.** 459–463. **524**

In order to study the effect of environment on the growth and well-being of farm animals, the authors constructed a special chamber in which the air temperature, relative humidity and external temperature can be accurately controlled. This entails the construction of an outer chamber and an inner animal chamber so arranged that the air temperature on the outside can be kept the same as that inside the animal chamber. The main difficulty was found to be an undue rise in temperature in the animal chamber. Details of the construction of such a chamber together with the equipment required for watering and air conditioning are described.—J. A. Nicholson.

Hinshaw, W. R. (1949.) **Effect of high temperatures on hens.**—*Vet. Med.* **44.** 435. **525**

Reduction in egg size, thin shells, decreased blood calcium, increased water consumption, increased body temperature and heart rate, panting and fall in egg production, reduction in fertility and hatchability of eggs and finally death were successively observed when air temperatures rose from 65°F. to over 100°F. Good ventilation, provision of shade, spraying and "ducking" may avert symptoms in very hot weather.

—R. Marshall.

Moule, G. R., & Pope, H. (1949.) **Performing the Mules operation on fully grown sheep.**—*Qd agric. J.* **69.** 108–110. **526**

A brief account is given of this operation applied to adult sheep. The technique of the operation is identical with that in younger sheep but it is found convenient to restrain the animal in such a way that the heavy work of lifting it is obviated. An opening is made in a panel of fencing around a small pen on a raised grating floor, about level with the operator's waist. The opening should be between 20 and 24 inches wide and run the full length of the side of the pen. A bar is placed horizontally across the opening about 12 inches from the grating floor. The bar must be so arranged that the operator, standing outside the pen, can easily swing it upwards or aside with his left hand. The sheep's hind quarters are swung under the horizontal rail which catches the hocks and prevents leg movement. After the operation the operator releases the bar and the catcher allows the sheep to fall forward on its feet outside the pen.—D. A. Gill.

TECHNIQUE AND APPARATUS

SCHMIDT, W. H., REEVES, M. D., CASTLE, F. J., & BENEDICT, R. G. (1948.) **An automatic agar dispenser.**—*Nature, Lond.* **162.** 903. **527**

This apparatus consists of a head-reservoir, a ball-valve and—to move the ball—a solenoid connected with an electric timer.—A. M.-H.

BOSSAK, H. N. (1949.) **An apparatus for the aseptic collection and dispensing of sheep blood.** —*Amer. J. clin. Path.* **19.** 496–498. **528**

An account of the usual type of equipment for the withdrawal and dispensing of blood under aseptic conditions.

See also absts. **272** (Whiteside test); **279** (mouse test in TB.); **280** (culture test in avian TB.); **289** (determination of growth of TB. bacilli); **298** (isolation of bacterial mutants); **320** (determination of *Leptospira* in water); **334** (flagellate cultures); **358** (rabies virus cultures); **359** (vaccine purification); **362** (influenza virus); **377** (distemperoid culture on chick embryos); **420** (skin test in schistosomiasis); **485** (electron microscope); **526** (Mules operation).

MISCELLANEOUS

OLSEN, M. W. (1949.) **Effect of shipment on pre-incubated fertile eggs.**—*Poult. Sci.* **28.** 731–738. [Author's summary copied *verbatim.*] **529**

Eggs were incubated for 18 hours, then candled to detect fertility, and cooled for two hours at 55 degrees F. Following this treatment, three groups of pre-incubated eggs together with control eggs, were packed in pre-cooled standard egg cases and shipped by express to different points, whence they were returned to Beltsville and incubated. The pre-incubated fertile eggs in transit from 50 to 96 hours gave hatchabilities of 78·4, 78·3 and 80·5 respectively. Unincubated fertile eggs shipped in the same cases gave hatchabilities of 70·3, 79·7 and 76·3 percent respectively. To test further the resistance of 18 hour embryos to adverse conditions, groups of pre-incubated fertile eggs were stored for 72 hours at 55 degrees F. Unincubated eggs served as controls and were stored at 55 degrees F. for 3¾ days. The experimental and control eggs were then incubated. The pre-incubated eggs gave an average hatchability of 82·7 percent as compared with 81·6 percent for the controls.

In another phase of these studies, eggs, after 18 hours of incubation, were candled and separated into three classes based upon the appearance of the embryo. Embryos showing advanced development comprised one class; those of intermediate development the second class; and those showing least development were placed in the third class. These three groups of eggs were then replaced in the incubator and allowed to hatch. Those embryos judged to be the most advanced at 18 hours gave an average hatch of 86·4 percent of fertile eggs; the intermediate ones, 65·2 percent; and the embryos showing the least development, 46·8 percent. In each of the 8 separate hatches, those embryos most advanced at 18 hours always hatched best; those of intermediate development gave the second highest hatch.

The foregoing studies show that it is entirely feasible to ship pre-incubated fertile eggs without a reduction in hatchability.

LACASSAGNE, A. (1948.) Observations chez l'homme, en conséquence de l'explosion de bombes atomiques, des principaux syndromes connus en radio-physiologie expérimentale. **[The appearance of the chief syndromes known in experimental radio-physiology in persons subjected to atomic bomb explosion.]**—*Bull. Acad. Nat. Méd.* **132.** 104–107. [Abst. in *Bull. Hyg., Lond.* **23.** 530. (1948), slightly amended. Signed: S. RUSS.] **530**

This is a brief but masterly summary of our present knowledge on the atomic bomb effect upon man. The author shows that there is no need to coin a phrase "*maladie de la bombe atomique*", for the biological effects observed on the population of Hiroshima and Nagasaki fall into well-recognized syndromes provided by experiment and observation with X-rays during the last 50 years.

It is, nevertheless, important to recognize the way in which the various reactions to these atomic explosions appear in the time scale. For those in the centre of explosion there is sudden death by suffocation, burns or flying débris; within a zone 1–1¼ kilometres grave radio-lesions, which were often fatal, were produced, with a total body radiation up to 800r. Deaths in the first few days were mostly due to infection supervening on radiation injury, the most conspicuous of which was upon the gastro-intestinal tract; following such lesions there occurred pneumonia, septicaemia and gangrene. The greatest number of deaths occurred after 3–4 weeks, and were due to "*le syndrome purpura*"; at this interval cases of complete epilation were seen.

At the end of one month cases of anaemia with red cell counts of 1,200,000 were seen, and in men there was azoospermy. Finally, up to a period of 3 months there was a large number of deaths due to malnutrition and cachexia.

The author mentions that some of the ships used in the Bikini tests were rendered uninhabitable because of their irradiation by the experimental test bombs.

REPORTS

GREAT BRITAIN. (Undated.) **Annual report of the National Institute for Research in Dairying, University of Reading, for the year ended 30th September, 1947.** [KAY, H. D.] pp. 67. Shinfield, Reading: National Institute for Research in Dairying. **531**

There are now seven research departments in the Institute. Three of these—the departments of Dairy Husbandry, Feeding and Metabolism and Lactational Physiology deal for the most part with the problems associated with the technique and physiology of milk production. The scope of these three departments includes questions of dairy farm management, growing of suitable feeding crops, nutrition of dairy stock, and control of reproduction and lactation. The other four departments—Bacteriology, Chemistry, Engineering and Nutrition deal in their respective spheres both with farm production and with the more industrial side of practical dairying and of dairy science; problems associated with distribution and processing of milk and with the quality of milk products are dealt with in these departments. There is also a Library (which provides accommodation for the Commonwealth Bureau of Dairy Science) and an Experimental Dairy. Details are given of the work of these various departments.

The dairy herd consists of 136 head of cattle of which 45 are cows or heifers in milk and 18 dry cows in calf. The herd contains 19 pedigree Guernseys and 116 Shorthorns, either registered or eligible for registration and one non-pedigree Shorthorn. No bull is kept at present, the Institute being entirely dependent on the Reading Cattle Breeding Centre for services in both breeds.

In addition, research has been carried out on behalf of the Agricultural Research Council by the Cod Liver Oil (Poultry) Standardization Laboratory in conjunction with the Nutritional Department. The Laboratory is taking part in tests organized by the Vitamin D Sub-committee of the Accessory Food Factors Committee of the Medical Research Council and trials are being made of the effectiveness of a new preparation of vitamin D_3 on chicks as compared with the British Standards Institution Standard and the U.S.P. Reference Cod Liver Oil No. 2.—D. S. R.

UNION OF SOUTH AFRICA, JOHANNESBURG. (1946.) **Report of the Director, Abattoir and Live Stock Market Department for the period 1st July, 1945 to 30th June, 1946.** [KIRKPATRICK, A. C.] pp. 15. Johannesburg: Radford, Adlington, Limited. **532**

The staff consists of 314 including two veterinarians.

There were 36,447 animals passed through the livestock market of which 10,235 were equines and 5,321 bovines. Since the inception of the market in 1910 a total of 41,370,964 animals have passed through it.

Reporting on the abattoir, it is stated that 874,528 animals were slaughtered during the year and a total of 1,667 tons of meat were condemned. Reasons for condemnation are given in a table.

On February 14th, 1946, a scheme came into force for the regulation of the production and marketing of livestock, meat and meat products. The scheme is run by a meat control board consisting of 19 members, only three being selected by consumers while producers have 11 representatives.

One of the greatest losses in meat was found to be caused by bruising of the live cattle during transit and precautions against this are being actively taken. The 709 dairy herds in the area were inspected and 17,020 cows were examined, this marking the re-institution of such inspection following the release of staff from military service.

The most serious diseases met with during the year in Johannesburg were LUMPY SKIN DISEASE and THREE-DAY FEVER. So far no control policy aimed at the eradication of TB. has been instituted.—D. S. RABAGLIATI.

WORK OF FAO 1947–48. (1948.) **Report of the Director-General to the Fourth Session of the Conference of the Food and Agriculture Organization of the United Nations.** pp. 90. Washington: FAO. Items of veterinary interest pp. 21; 24 and 35. **533**

In Czechoslovakia. An F.A.O. Veterinary Consultant gave instruction to groups of veterinarians on the control of TB., BRUCELLOSIS, NEWCASTLE DISEASE of poultry, dairy and meat sanitation, artificial insemination of cows, TESCHEN DISEASE and parasites of livestock.

Two F.A.O. Veterinarians have been engaged on RINDERPEST control in China. Avianized vaccine (chick embryo vaccine) is being produced in large quantities in China and is being used in an area south of the Yangtse River. Fifteen million cattle and water buffaloes were to be vaccinated. The F.A.O. consultants have also assisted the Chinese in the production of vaccines for the control of SWINE ERYSIPELAS, HAEMORRHAGIC SEPTICAEMIA, SWINE FEVER and NEWCASTLE DISEASE. Assistance has also been given for poultry improvement and vaccination to control NEWCASTLE DISEASE and other outbreaks of disease, as well as treatment for STERILITY and surveys of the livestock diseases.

In Siam, the F.A.O. Mission recommends the use of avianized or lapinized virus for the control of RINDERPEST in water buffaloes, which are indispensable for cultivating the small paddy fields, and of goat virus for cattle.—J. A. G.

BOOK REVIEWS

KUNERT, H. [Edited by]. (1949.) Ein deutscher Tropenarzt, Friedrich Karl Kleine. Einführung von Herbert Kunert. **[A German medical practitioner in the tropics, F. K. Kleine. Collected papers arranged by Kunert, H.]** pp. 182. Hanover: Schmorl & von Seefeld Nachf. DM. 12. **534**

Friedrich Karl Kleine, at one time President of the "Robert Koch" Institute for Infectious Diseases in Berlin, celebrated his 80th birthday in 1949 in retirement in South Africa. Kleine is best known for his discovery in 1909 of the development of trypanosomes in the insect host. The crucial experiment consisted in the successful transmission of *Trypanosoma brucei* to an ox by a tsetse fly, *G. palpalis*, 25 days after it (the tsetse fly) had fed on another infected ox. The work was carried out near Lake Victoria in an area free from nagana and the *G. palpalis* were infected by feeding them on two sheep and a donkey brought from a nagana area in the hinterland. The experiments were repeated with monkeys infected with *T. gambiense*, using tsetse flies bred in the laboratory.

Although most of Kleine's work in East and West Africa was devoted to human sleeping sickness he also took an interest in trypanosomiasis in domestic stock and in other stock diseases in Africa. A list of nearly 90 published papers bears witness to his contributions to tropical medicine.

This book consists of a short biographical chapter by the editor, Kunert, followed by seven chapters by Kleine which cover the most important of his investigations in Africa. The last section is the text of an address, in English and German, which he gave at Onderstepoort in September, 1936.

In 1900 Kleine came to work under Robert Koch in Berlin. He accompanied Koch to Africa in 1902 and also again in 1906 on the German Sleeping Sickness Expedition and remained behind as Director of Sleeping Sickness Control for German East Africa. During the 1914–18 war Kleine worked for a time in the Cameroons and in 1925 he took part in the League of Nations Sleeping Sickness Expedition to Uganda and later spent some time in Kenya and Tanganyika. His last research expedition to Africa was in 1934–35.

Kleine carried out extensive trials of "Bayer 205" and found that this drug was far superior to "atoxyl" and cured 100% of fresh cases of human sleeping sickness. The blood was immediately sterilized from infection and the patients were no longer a source of infection of tsetse flies. "Bayer 205" was of no value in cattle trypanosomiasis in Africa, but later was used widely for treatment of surra in horses, cattle and dogs in India. Kleine points out the danger of assuming from experiments with one species that a drug may be effective in another and he quotes Robert Koch's saying "Vergessen Sie nie, dass Mäuse keine Menschen sind."

This book will be of much interest to those engaged in tropical countries where trypanosomiasis occurs. Accounts of Robert Koch, David Bruce, Castellani and other figures of the early twentieth century are of considerable interest. Kleine has something to say, too, of the habits and customs of Africa which are so important in their effects on measures designed to control diseases. The book is written simply and clearly and can be understood easily by anyone with a fair knowledge of technical German.

[It is of interest to note that Forde, R. M., who was the first person to see trypanosomes in blood of a human patient in 1901, is described erroneously in this book as an English veterinary surgeon. Forde was a medical officer in Gambia and was not a veterinary surgeon.]—E. G. WHITE.

GASTINEL, P. [Professor of Bacteriology at the Faculty of Medicine, Paris. Member of L'Académie de Médecine]. (1949.) Précis de bactériologie médicale. **[Medical bacteriology.]** pp. xv + 1040. 144 figs. Paris: Masson et Cie. Fr. 2800. **535**

This beautifully produced work is worthy of admiration and will surely serve as the standard work of reference in France and elsewhere. The chapter on tuberculosis and BCG, for example, is well worth study. On the whole the information presented is up to date, including details of the sulphonamides, penicillin, and streptomycin. Virulence, immunity, and allergy are discussed, and the sections on individual organisms each contain a short historical note, an anatomico-clinical description of the disease, microscopic morphology of the organism, culture methods, biochemical properties, pathogenicity, antibody production and vaccination, portals of entry, and diagnosis.

The book is serviceably bound and well illustrated, paper and print are good, and there is a 15-page alphabetical index. Dr. P. Nicolle has contributed a chapter on bacteriophage.—W. R. B.

MICHELSEN, E. (1949.) Mund- og klovesyge virus. Studier over den antigene variabilitet. **[Foot and mouth disease virus. Studies on its antigenic variability.]** pp. 162. Copenhagen: A/S Carl Fr. Mortensen. [English & French summaries.] **536**

There must be considerable loss to the reader of this Doctorate thesis who cannot read Danish as some 120 pages of that language are condensed

into seven-page summaries in English and French. Nevertheless, these summaries and the numerous tables in the text are a great help to an understanding of what the author has to say. Antigenic variability is one of the biggest problems of foot-and-mouth disease research and the author must be congratulated on making this attempt to unravel some of its complexities.

Important sections of the work deal with the author's use of the complement-fixation test in type differentiation and with his persistent attempts to turn his observation of the agglutination of rat red cells by F. & M. disease infective material into a practicable *in-vitro* test for diagnosis and type differentiation. It is to be hoped that the encouragement of some promising results will lead to a solution of the many difficulties of this type of test.

Although no antigenic changes were observed in the routine passaging of stock type strains in g. pigs, the possibility of such changes occurring during experimental manipulations has interested the author. The effect of drying virus, of irradiation with X-rays and of persistence in the host tissues has been studied from this point of view. Three cases of some change in antigenicity are recorded following freeze-drying. No definite change was observed following exposure to X-rays with doses varying from 5,000 to 500,000 *r*. It is perhaps noteworthy that these doses did not inactivate the virus—although attempts were made at purification beforehand—in fact, the author reports that occasionally a higher titre was recorded after irradiation and when the titre was unchanged the irradiated virus appeared to produce a more severe disease. Virus was recovered from the tissues of two out of 321 g. pigs examined 7–102 days after infection, these two g. pigs having been infected respectively 22 and 30 days earlier. No change in antigenicity was detected. One hundred and seventy-nine samples of urine collected 10–50 days after infection from 40 cattle were examined for the presence of virus with negative results.

Protocols of a number of other experiments are given, particularly cross-immunity tests, with some discussion of possible antigenic patterns of variant strains of virus.—W. M. Henderson.

Horsfall, F. L., Jr. [Edited by]. (1949.) **Diagnosis of viral and rickettsial infections. [Symposium held at the New York Academy of Medicine January 29 and 30, 1948.]** pp. x + 158. New York: Columbia University Press; London: Geoffrey Cumberlege. 30s. **537**

This is a symposium in which specialists deal with the modern methods of diagnosis of some 32 specific virus and rickettsial infections of man. The infections of direct veterinary interest which are discussed are influenza, psittacosis, encephalomyelitis, rabies and Q fever, but many of the others are of comparative interest. Highly specific and sensitive reactions for identification of viruses and rickettsia have been developed in recent years and are clearly described in this most useful publication. In the section on "Q" fever the warning is given that diagnosis by isolation of the organism in experimental animals or in chick embryos is so dangerous that laboratory workers should avoid this method. Serological methods using complement-fixation tests with antigens of approved strains provide the best diagnostic procedure.—M. C.

Brumpt, E. (1949.) Précis de parasitologie. Vol. I & II. **[Parasitology. Vol. I & II.]** pp. xii +2138. Paris: Masson et Cie. 6th Edit. **538**

A new edition of this very well known textbook is an event of interest to protozoologists, helminthologists, entomologists, mycologists, public health officers, especially those in the Tropics, epidemiologists, etc.

The period which has elapsed since the 5th edition appeared in 1936 has been a very fruitful one marked by great advances in knowledge of the role of arthropod vectors of disease; the life cycle of plasmodium and the rickettsial diseases, to mention only a few. To incorporate this mass of new knowledge it has been necessary to enlarge the size of the two volumes very considerably and its name "Précis" seems to be inappropriate to English-speaking readers. A feature is the number of photographic illustrations—some 1,300 in number—of which 513 are original, many of them collected by the author in the course of numerous journeys to many parts of the world.

Although human diseases are the main interest of the book, the diseases of animals are not overlooked. The author says in his preface that he would have liked to give more space to comparative parasitology which, by study of experimentally infected animals, has led to the discovery of new remedies for malaria and filariasis, but space has compelled limitation. It is very up-to-date: even the recent work of Shortt & Garnham on the exoerythrocytic stages of *P. vivax* in man has been included in an addendum.

There is no other book which covers such a wide field in such a competent manner; its 2,138 pages constitute a veritable library in miniature and its value to those who have to work in remote areas far from library facilities is incalculable.

—M. C.

Geurden, L. (1949.) Ziekten en Gebreken in het Pluimveebedrijf. **[Diseases of fowls.]** pp. 121. Antwerp: N. V. Standaard-Boekhandel. 55 fr. **539**

This book, intended for the poultry keeper, consists of three parts. The first two parts deal with the anatomy and physiology of the domestic fowl, the pathology of the egg, the embryo, the chick and the adult bird. The more common infectious diseases, hereditary disorders and parasites are discussed. The third part deals with the diseases of ducks.—E. G.

GEURDEN, L. (1946.) Plagen op het Duivenhok. **[Diseases of pigeons.]** pp. 59. Antwerp: N. V. Standaard-Boekhandel. Fr. 29. **540**

This booklet is written for the layman. The part on organic disorders deals with abnormalities in laying and in fertilization, diseases of the reproductive apparatus, diseases of newly hatched and young birds, and poisoning.

The remainder is a brief discussion of TB., *Erysipelothrix rhusiopathiae* infection, pasteurellosis, pseudotuberculosis, coryza, aspergillosis, trichomoniasis, pox and ecto- and endo-parasites.

—E. G.

GEURDEN, L. M. G. (1946.) De Ziekten der Volierevogels. **[Diseases of cage birds.]** pp. 32. Antwerp: N. V. Standaard-Boekhandel. Fr. 25. **541**

A brief, general account of diseases of cage birds, written for laymen. The booklet is divided into three parts, dealing with nutritional and metabolic disorders, non-infectious and infectious diseases.—E. G.

PLEUGER, R. (1948.) Individualpathologie. Gesammelte Hinweise fürden praktischen Arzt. **[Individual pathology. Collected advice for the medical practitioner.]** pp. 160. Berlin: Karl F. Haugh Verlag. DM. 8. **542**

The author writes on clinical human medicine from the point of view of the individuality of the patient. The seven chapters are devoted respectively to :- the disease and the individual; factors that influence individuality in relation to disease; Speransky's observations (the relation between disease and the nervous system); the pathology of the individual in practical medicine; the role of the nervous system in individual pathology; practical experience; the miracles of practice; lay treatment, faith healing and household remedies.

VANNOTTI, A. [M.D.; Director of the Medical Polyclinic, and Professor of Internal Medicine in the University of Lausanne], & DELACHAUX, A. [M.D.; Lector of the Medical Polyclinic of the University of Lausanne]. (1949.) **Iron metabolism and its clinical significance.** pp. 267. London: Frederick Muller Ltd. 32s. [In English.] **543**

The importance of iron in biological processes has been known for many years, but as far as higher animals are concerned attention has been paid mainly to the haemoglobin iron and it is only comparatively recently that the importance of the non-haemoglobin iron to the animal body has been fully realised.

In this book, it is the latter which is exclusively considered since the metabolism and function of haemoglobin is so well known. Firstly, the metabolism of the non-haemoglobin iron in the normal subject is dealt with, particularly the forms in which it occurs in the blood and the methods employed to recognize them, then its metabolism under pathological conditions is discussed and finally, the indications for iron therapy in the treatment of the various anaemias seen in the human subject are dealt with.

The subject has been approached with the eye of a clinician and actual cases are used to illustrate the points raised, details of the more important biochemical tests of value in diagnosis being also included. As a result, a clear and interesting account of the subject has been given and there can be little doubt that a study of this book is essential for anyone working on the anaemias of animals as well as for those concerned with the nutritional aspects of iron metabolism.

—J. A. NICHOLSON.

MARKOWITZ, J. [M.B. (Tor.), Ph.D., M.S. in Exp. Surg. (Minn.); Associate Professor of Physiology, University of Toronto; Formerly Assistant in Division of Experimental Surgery & Pathology, Mayo Foundation, Rochester, Minn.] (1949.) **Experimental surgery including surgical physiology.** pp. xiv + 546. London: Baillière, Tindall & Cox. 2nd edit. 54s. **544**

The dog is the common laboratory animal of experimental surgeons and physiologists and many of the surgical techniques evolved in the laboratory, and the physiological observations resulting from the use of such techniques, are of great interest to veterinarians. Unfortunately, much of this work, being published in specialist journals, was not readily available and it was therefore not surprising that this work, when first published, was warmly received by the veterinary profession since it contained descriptions of all the most common and successful operative techniques employed in the laboratory. To those acquainted with the first edition all that need be said of the new edition is that it has been brought fully up to date by the inclusion of numerous new techniques. As the book, however, has been out of print for several years in this country it may not be as well known as it deserves to be, and a fuller description of its contents would seem justifiable.

The book covers a very wide field of experimental operative procedures, although it is not

claimed to be a compendium, and is primarily intended for physiologists and graduate students of surgery. Of the 29 chapters which compose the book, those dealing with surgical equipment, technique of suturing, techniques of abdominal, intestinal, thoracic and bone surgery are of special veterinary interest; whereas those on duct and organ transplantation, surgery of the endocrine, vascular, and nervous systems are of more direct interest to physiologists. Each chapter is provided with an adequate bibliography. Operative procedures and techniques are clearly and concisely described and the text is generally supplemented by excellent drawings and diagrams. Throughout the book the author stresses the importance of the physiological approach to surgery, and operative procedures are considered against their physiological background.

This book is remarkably complete in the range of surgical techniques described. Veterinarians may perhaps be a little surprised, however, to find no reference in the chapter on anaesthesia to Professor Wright's book on "Veterinary Anaesthesia"—a most useful work of reference for the experimental physiologist. Again the research worker will find in the chapter on vascular surgery no mention of the cannula technique devised by London (or the more recent "plastic-tube" modification of this procedure) whereby frequent samples of blood may be obtained from the portal vein in the unanaesthetized animal—a simple and useful research technique. These, however, are trivial omissions.

The author's somewhat discursive style and the occasional insertion in the longer chapters of a few lines of apposite comic verse result in a book which is a pleasure to read. Might we suggest, however, that in future editions translations be appended to the quotations from Lucretius and other Latin writers?

The majority of physiologists and veterinarians will get inspiration and new ideas on surgical techniques from this excellent book. Students of surgery will find it an invaluable guide to the acquisition of sound surgical techniques which distinguish the surgical craftsman from the "hewer of flesh and drawer of blood".

—Alfred T. Cowie.

Souttar, H. S. [D.M., M.Ch. (Oxon.), F.R.C.S. (Eng.), Hon. M.D. Trinity College, Dublin, Hon. F.R.A.C.S.; Consulting Surgeon, London Hospital]. (1948.) **Physics and the surgeon.** pp. vii + 60. Oxford: Blackwell Scientific Publications, Ltd. 7s. 6d. **545**

In this little book, a surgeon discusses those aspects of physics which are of general importance in clinical medicine. The main subjects dealt with are the mechanics of movement as exemplified by a man rowing, traction as applied to fractures, forces the body can withstand, especially the skull, heat and electrotherapy. Finally, an outline is given of atomic structure, isotopes and radiation.

The text, although somewhat disjointed, is sufficient to stimulate interest in physics as applied to clinical work and the practitioner will find that the principles expounded here are in great part applicable to veterinary medicine, particularly in small animal practice.—J. A. Nicholson.

Laroux, P. (1948.) Constitution chimique et activité des molécules thérapeutiques. **[Chemical constitution and activity of therapeutic molecules.]** pp. 118. Paris: Masson et Cie. Fr. 310. **546**

This small book has been written for those medical men who wish to know something about the background of chemistry and mode of action of the more recently introduced therapeutic agents. Divided into two parts, the first deals with the actual structure and constitution of the organic molecules and the second with the relationship between structure and activity (pharmacodynamics) and classifies compounds by their action. The author has not attempted to cover all the compounds but has made a selection on therapeutic or industrial grounds, and includes for example, pentothal, dolantin (a German preparation, a non-irritating anaesthetic), paludrine [wrongly indexed], nor-adrenalin, scopolamine (an alkaloid), antergan and neoantergan (anti-histamines), thiouracil, sulphonamides and penicillin. The book is paper-backed, and there is no bibliography.—M. W.

D'amour, F. E., & Blood, F. R. (1949.) **Manual for laboratory work in mammalian physiology.** pp. 164. Chicago, Ill.: University of Chicago Press. $2·75. **547**

In order to overcome the very real difficulty of obtaining suitable experimental animals for practical physiology classes, the authors propose the use of the white rat for all students' work.

The aim has been to provide a year's course of practical work, using solely the rat as the experimental animal. Fifty classes which include all the more usual experiments carried out by students are given. The apparatus required for each experiment is also described and the construction of any special piece of apparatus is described and illustrated. The book is intended for students' use and the objects of the experiments and the steps to be taken in carrying them out are clearly tabulated and illustrated by excellent photographs. Blank pages are inserted throughout for students' reports and the binding is by means of metal rings so that the book can be opened flat on the laboratory bench.

The design of the experiments and the arrangement of the course are well thought out and there is no doubt that such a course of practical work would be of immense benefit to students of veterinary physiology. For a variety of reasons such a course may not be practicable but, nevertheless, a study of this book should prove of great interest and assistance to all those who have the task of conducting a course in practical physiology.
—J. A. NICHOLSON.

MAXIMOW, A. A. [Late Professor of Anatomy, University of Chicago], & BLOOM, W. [Professor of Anatomy, University of Chicago]. (1948.) **A textbook of histology.** pp. xi + 700. London: W. B. Saunders Co. 5th Edit. 42s. **548**

Although a considerable amount of new material has been incorporated, the text occupies 661 pages as compared with 663 pages of the previous edition. There are now two columns of print to a page, and the book seems easier to read. The number of illustrations is still 562, but some former ones have been omitted and new ones added. The latter include: coloured plates of the heterophile leucocytes of various species; a photomicrograph of an autoradiograph of thyroid gland of a rat previously injected with I^{131}; sections of human spleen and colon; sections of degenerative and regenerative changes in the crypts of Lieberkühn in the duodenum of the rat following exposure to X-rays. New black-and-white illustrations include photomicrographs taken by phase difference and electron microscopy; photomicrographs of sections of human lung at, and at various times before and after, birth; rabbit kidney showing alkaline phosphatase; autoradiographs of the distal ends of the femurs of rats after injection with plutonium or P^{32}; and a seven and a half day ovum embedding.

In the chapter on protoplasm, W. L. Doyle deals with its submicroscopic organization. The chapters on the haemopoietic and blood-destroying and the nervous tissues have been shortened, and there is some re-writing elsewhere, as in the chapter on bone. The section on the respiratory structures of the lung has been revised, and is now illustrated by an informative series of photomicrographs.

The word "granular" should be inserted in the statement (p. 49) that "this type of leucocyte [the heterophile] is the most numerous . . . in the blood of all vertebrates". If the statement on p. 390, that only in the fourth part of the ruminant stomach does digestion occur, is to stand, it should be made clear what term is to be applied to the processes occurring in the rumen.

The book fully maintains the standard and character familiar to users of previous editions.
—E. COTCHIN.

KELLERMANN, R. (1949.) Milchwirtschaftliche Mikrobiologie. [**Microbiology of milk production.**] Vol. 6, Part 2. pp. 215. Hildesheim: Ernst Heinrichs. DM. 6.50. **549**

This is a cheaply produced textbook for students of dairying, agriculture and medicine. The first 80 pages deal with general microbiology. The next section, of about the same length, covers special microbiology and deals with yeasts, moulds and bacteria. Mastitis, TB., brucellosis, foot and mouth disease and cow pox form a special chapter in this section. The remaining 40 pages are devoted to microscopic and cultural methods. There are 126 black and white drawings, the sole illustrations: they are mostly roughly drawn diagrams of organisms, apparatus, etc., rather like blackboard sketches.

The book appears to be one of a series of technical publications dealing with dairying. There is an index. The text is clearly written and the ground is amply covered without giving details beyond those of value to undergraduate students.—E. G. WHITE.

KENNETH, J. H. [M.A., Ph.D., F.R.S.E. Revised by]. (1948.) **Henderson's Dictionary of scientific terms.** pp. xvi + 480. London & Edinburgh: Oliver & Boyd. 4th Edit. 32s. **550**

In the revised fourth edition of this well known dictionary, Kenneth, the original compiler of the primary lists for the first edition published in 1920, states in the preface that the volume contains "some two thousand additional terms, many of which have not hitherto been included in a dictionary". He has also increased the number of cross-references, as he states "not without due regard to American spelling". Further abbreviations and a short list of equivalent units of measurement have been added.

The same plan has been followed with regard to derivations as in earlier editions, the Greek words being given in transliterated form for easy reading by those who have no knowledge of Greek. Alternative methods of pronunciation are given in many cases, in recognition of the modern tendency towards the clipping and shortening of enunciation, *e.g.* in the word photosynthesis, the second o is shortened to the o sound at the end of anatomy.—F. E. W.

TRELEASE, S. F. [Columbia University]. (1947.) **The scientific paper: How to prepare it: How to write it.** pp. xii + 152. Baltimore: The Williams & Wilkins Co.; London: Baillière, Tindall & Cox. 11s. **551**

This admirable little manual is intended mainly to be a guide to students and research

workers who are preparing a scientific thesis or dissertation. It should, indeed, be a source of help to all who compile, edit, review, or abstract scientific papers or books for publication.

The work, originally published under the title " The Preparation of Scientific and Technical Papers ", has in its present form been revised and enlarged and almost entirely re-written and a new section has been added on the use of the scientific library for research purposes.

The author begins with criteria for choosing a research problem and deals in turn with the planning and outline of a paper, giving suggestions on subject matter and arrangement, the title, introduction, discussion of results and the abstract or summary. He emphasizes the need for the latter to be " well-written, so as to be easily read and understood, and . . . self-explanatory, complete and clear in itself." In the writing of the paper the author advises the use of " words that a foreigner will be able to find in a small dictionary ". Guidance is given on the use of tenses, on punctuation and revision of manuscript, preparation of the typescript, headings, corrections and final revision. He also deals with estimation of length, kinds of type (which are illustrated), with the use of capitals, italics, abbreviations, nomenclature, etc.

A section is devoted to the preparation of tables, another to " indexing and abstracting tools ". (The bibliographical sources quoted in this connexion are mainly American and some of the British ones which have come to the fore during the last two decades are not mentioned, as for example those of the Commonwealth Agricultural Bureaux and the *Bulletin of Hygiene*. The very important post-war newcomers are, of course, not mentioned in this edition.) Other sections deal with methods of preparing a bibliography and abbreviations of the names of journals, etc. Illustrations and their planning and preparation are given, a fairly long section which includes notes on the preparation of lantern slides for lectures. The last section gives information and advice on how to read galley and page proofs and includes examples of the indications used for correction of these proofs.

There is a good bibliography and an alphabetical index.—F. E. W.

BOOKS RECENTLY RECEIVED

[Notice of recently received books in this list does not preclude review]

ALLEE, W. C., EMERSON, A. E., PARK, O., PARK, T., & SCHMIDT, K. P. (1949.) **Principles of animal ecology.** pp. xii + 837. Philadelphia & London : W. B. Saunders Co., Ltd. 70s.

BOURNE, G. H. (1949.) **The mammalian adrenal gland.** pp. vi + 239. Oxford : Geoffrey Cumberlege, Oxford University Press. 30s.

BURROWS, H. (1949.) **Biological actions of sex hormones.** pp. xiii + 615. London : Cambridge University Press. 2nd. edit. 42s.

FLEMING, A. (1949.) **Penicillin : its practical application.** pp. xii + 471. London : Butterworth & Co. (Publishers), Ltd. 2nd. edit. 30s.

MØLLER-SØRENSEN, A. (1949.) Laerebog i den specielle Veterinaerkirurgi. [**Textbook of special veterinary surgery.**] pp. 534. Copenhagen : Carl Fr. Mortensen.

NEUMANN-KLEINPAUL, K., & DOBBERSTEIN, J. (Edited by). (1948.) Fröhner's Lehrbuch der Gerichtlichen Tierheilkunde. [**Fröhner's textbook of German law concerning veterinary practice, sale and warranty of livestock and cruelty to animals.**] pp. xi + 356. Berlin : Richard Schoetz. DM. 22.

NUSSHAG, W. (1949.) Lehrbuch der Anatomie und Physiologie der Haustiere. [**Anatomy and physiology of domestic animals.**] pp. xi + 269. Leipzig : S. Hirzel.

SCHUURMAN & JORDENS (Edited by). VAN VLOTEN, J. M., & VERGRACHT, J. H. (Revised by). (1949.) Vleeskeuringswet. Destructiebesluit. [**Meat inspection.**] pp. 375. Zwolle : N. V. Uitgevers-Maatschappij. W. E. J. Tjeenk Willink.

SHIELDS, J. & H. (1949.) **The modern dairy goat.** pp. xiv + 172. London : C. Arthur Pearson, Ltd. 7s. 6d.

THOMAS, J. F. H. (1947.) **The grazing animal.** pp. 173. London : Faber & Faber, Ltd. 15s.

WIRTH, D. (1949.) Einführung in die Klinische Diagnostik der inneren Erkrankungen und Hautkrankheiten der Haustiere. [**Clinical diagnosis of internal and skin diseases of domestic animals.**] pp. 175. Vienna : Urban & Schwarzenberg. 3rd improved & enlarged edit. S. 38.

6052—Wt.P3—Dd294—6/50—H.R.G., Ltd.—G.13.

Printed in Great Britain under the authority of His Majesty's Stationery Office by H. R. GRUBB, LTD., Croydon.

INDEX VETERINARIUS

The publication of *Index Veterinarius* commenced with the indexing of the literature of 1933. It is a complete index of current publications relating to veterinary research, public health, administration, education and other aspects of veterinary science.

The latest list of the publications searched for this purpose was circulated with the *Veterinary Bulletin*, Vol. 20, No. 1.

About 10,000 references are indexed each year, each reference being suitably cross-indexed alphabetically under subjects and under names of authors.

As each issue consists of a single complete alphabetical index of subjects and authors' names, a search through it involves a minimum of trouble, and all information required is readily found.

Vols. 1 to 5 (1933 to 1937) were issued quarterly, each volume covering the literature searched in the previous quarter, and Vols. 6 to 12 (1938 to 1944) half-yearly, each volume covering the literature searched in the previous six months. Vol. 13 (published 1946) was a single annual issue covering the literature searched in 1945; Vol. 14 is a single issue covering the literature searched in 1946. Vol. 15 will also be a single issue.

Stocks of Vols. 4, 5 and 13 are available: price £5 per volume. Other volumes incomplete: details on request.

Orders may be sent to: Central Sales Branch (Commonwealth Agricultural Bureaux), Agricultural Research Buildings, Penglais, Aberystwyth, Wales.

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

INDIAN JOURNAL OF VETERINARY SCIENCE AND ANIMAL HUSBANDRY

Quarterly

Journal devoted to the publication of scientific research relating to the health, nutrition and breeding of livestock.

Annual subscription, Rs.6; per part, Rs.2.

INDIAN JOURNAL OF AGRICULTURAL SCIENCE

Bimonthly

Journal of agriculture and the allied sciences, mainly devoted to the publication of the results of original research and field experiments.

Annual subscription, Rs.15; per part, Rs.3.

INDIAN FARMING

Monthly Magazine for the Layman

Features of the magazine include original articles of practical interest to farmers, *What the scientists are doing, What's doing in all India, What would you like to know?* etc., of special interest to farmers, landowners, rural development workers, co-operative societies, government officials, clubs, libraries and college students.

Annual subscription, Rs.6; single copy, As./8/-.

Manager of Publications, Civil Lines, Delhi

COMMONWEALTH AGRICULTURAL BUREAUX

JOURNALS PUBLISHED BY BUREAUX ON RELATED SUBJECTS

	Published by the:—
Dairy Science Abstracts	Commonwealth Bureau of Dairy Science, Shinfield.
Animal Breeding Abstracts ...	Commonwealth Bureau of Animal Breeding and Genetics, Edinburgh.
Herbage Abstracts	Commonwealth Bureau of Pastures and Field Crops, Aberystwyth.
Nutrition Abstracts and Reviews	Commonwealth Bureau of Animal Nutrition, Aberdeen.

Annual subscription to the first three is 35s. (with a special reduction of 20 per cent. for orders received direct from subscribers in Great Britain, the Dominions and Colonies); the annual subscription to Nutrition Abstracts and Reviews is 60s.

RECENT OCCASIONAL PUBLICATIONS ON AGRICULTURE AND FORESTRY

BUREAUX JOINT PUBLICATIONS

No.		Price
9.	The use of aerial survey in forestry and agriculture. Commonwealth Bureaux of Forestry and Pastures and Field Crops, 1946 ...	7s. 6d.
10.	The use and misuse of shrubs and trees as fodder. Bureaux of Pastures and Field Crops, Forestry, and Animal Nutrition, 1946	9s. 0d.
11.	Some British books on agriculture, forestry and related sciences, 1939–45. July, 1946	3s. 0d.
12.	Phenothiazine, a review and bibliography	4s. 0d.

TECHNICAL COMMUNICATIONS, ETC.

	Commonwealth Bureau of Animal Health, Weybridge.	
	Review Series No. 2. Modes of spread of *Streptococcus agalactiae* infection in dairy herds. A report on co-ordinated observations by the Agricultural Research Council of the United Kingdom. May, 1944	3s. 0d.
	Commonwealth Bureau of Animal Nutrition, Aberdeen.	
15.	Minerals in pasture. Deficiencies and excesses in relation to animal health. By F. C. Russell. May, 1944	5s. 0d.
16.	Diet in relation to reproduction and the viability of the young. Part 1. Rats and other laboratory animals. August, 1946	6s. 0d.
	Commonwealth Bureau of Animal Breeding and Genetics, Edinburgh.	
	The semen of animals and its use for artificial insemination. By James Anderson. Spring, 1945	7s. 6d.
	Commonwealth Bureau of Pastures and Field Crops, Aberystwyth.	
36.	The grasslands of Latin America. By Miss G. M. Roseveare. Late 1946 ...	20s. 0d.
38.	Advances in grassland husbandry and fodder production. Second symposium. Late 1946...	6s. 0d.
	Commonwealth Bureau of Plant Breeding and Genetics, Cambridge.	
	The new genetics in the Soviet Union. By P. S. Hudson and R. H. Richens. May, 1946	6s. 0d.
	Commonwealth Bureau of Soil Science, Harpenden.	
43.	Land classification for land-use planning. June, 1946	4s. 0d.
	Commonwealth Mycological Institute, Kew.	
	An annotated bibliography of medical mycology, 1945. 1946	5s. 0d.

Subscriptions

All correspondence regarding subscriptions to journals and sales of occasional publications should be addressed to, and cheques made payable to:—Central Sales Branch (Commonwealth Agricultural Bureaux), Penglais, Aberystwyth, Wales.

Printed in Great Britain by H. R. Gruss, Ltd., Croydon